Health impact assessment of quality wine production in Hungary

BALÁZS ÁDÁM, ÁGNES MOLNÁR, HELGA BÁRDOS and RÓZA ÁDÁNY*

Department of Preventive Medicine, Public Health Research Group of the Hungarian Academy of Sciences, Faculty of Public Health, Medical and Health Science Center, University of Debrecen, Debrecen, Hungary
*Corresponding author. E-mail: adany@dote.hu

SUMMARY
Alcohol-related health outcomes show strikingly high incidence in Hungary. The effects of alcohol consumption are influenced not only by the quantity, but also the quality of drinks; therefore, wine production can have an important effect on public health outcomes. Nevertheless, the Hungarian wine sector faces several vital problems and challenges influenced by the country’s accession to the European Union and by the need for restructuring. A comprehensive health impact assessment (HIA) based on the evaluation of the Hungarian legislation related to the wine sector has been carried out, aiming to assess the impact of the production of quality wine versus that of table wine, using a range of public health and epidemiological research methods and data as well as HIA guidelines. The study finds that the toxic effects of alcohol can be reduced with an increased supply of quality wine and with decreased overall consumption due to higher cost, although this might drive some people to seek illegal sources. Quality wine production allows for improved use of land, creates employment opportunities and increases the incomes of producers and local communities; however, capital-scarce producers unable to manage restructuring may lose their source of subsistence. The supply of quality wine can promote social relations, contribute to a healthy lifestyle and reduce criminality related to alcohol’s influence and adulteration. In general, the production and supply of quality wine can have an overall positive impact on health. Nevertheless, because of the several possible negative effects expected without purposeful restructuring, recommendations for the maximization of favourable outcomes and suggestions for monitoring the success of the analysis have been provided.

Key words: health impact assessment; quality wine; wine production

INTRODUCTION
Uncontrolled alcohol consumption and its health consequences are major public health concerns in Hungary. Premature death caused by alcohol-related chronic diseases shows very unfavourable figures compared with other European Union (EU) countries, and even to most Central-Eastern European countries (Szűcs et al., 2005; Ádány, 2006). Hungary suffers from peculiarly high rates of death from chronic liver disease and cirrhosis. Premature mortality had a dramatic, almost 9-fold, increase from 1970 to 1994, when it exceeded that of the EU by almost seven times. Since then, a gradual decrease has occurred, but the premature mortality rate is still around four times higher than the EU average (World Health Organisation, 2007). Nevertheless, the problem of alcohol-related health impairment is a common feature of the Central-Eastern European region, as seen in Figure 1.
It has been realized that, besides the quantity of alcohol consumed, the quality of alcoholic beverages also plays an essential role in the development of chronic liver diseases. Consumption of poor quality, home-made illegal alcoholic beverages with high hepatotoxicity may contribute highly to the development of liver diseases (Szűcs et al., 2005). Some pollutants, typically aliphatic alcohol congeners such as isoamyl alcohol, can induce pronounced liver damage (McKarns et al., 1997; Strubelt et al., 1999). On the other hand, alcoholic drinks, especially wine, may also have positive health effects. Flavonoid components of red wine can be advantageous to human health in various ways (Opie and Lecour, 2007). Consumption of the main types of alcoholic drinks is evenly distributed in Hungary, with the distribution of consumption being 34.9% for wine, 33.2% for beer and 31.9% for spirits in 2005, with an increasing share for wine and spirits versus beer since 1990 (Hungarian Central Statistical Office, 2007).

The wine sector plays an important role in European and Hungarian agriculture, too. Hungary has excellent viniculture conditions and long-standing traditions of wine production. The Hungarian people have always been proud of their wine, such as of the world-famous brand Tokaji (Anglicized name Tokay), which is why the significance of wine production goes beyond its economic importance. Nonetheless, the Hungarian wine sector faces several vital problems that need to be overcome. The valuable old traditions of viniculture in Hungary were spoiled badly in the previous political era when emphasis was placed on the quantity and not the quality aspect of production. Although this faulty production strategy from the past has been changing since the political transition (1989/1990) and several successes have been achieved, the sound development of the sector still faces difficulties. The redirection of export routes necessary after losing former external markets and the restructuring and modernization of wine production are the most important needs, but the shortage of funds for several small wineries and the lack of cooperation are serious handicaps in fulfilling these goals (Sidlovits, 2005; Szakál, 2006). In 2004, the country joined the EU and harmonized its legislation covering grape growing and wine production. The modified legal background has affected the Hungarian wine sector, and the ongoing changes in the EU wine strategy to reorganize the common wine market pose new challenges as well.

Health impact assessment (HIA) is a rapidly developing methodology that enables the identification, prediction and evaluation of the potential health effects of a policy, programme or project on a defined population. An EU project, named Health Impact Assessment in New Member States and Accession and Pre-Accession Countries (HIA-NMAC), was launched with the goal of strengthening HIA capacity, advancing methodology and consolidating HIA networks in

![Fig. 1: Premature mortality caused by chronic liver disease and cirrhosis in males in selected Central and Eastern European countries compared to the EU average, 2004.](https://academic.oup.com/heapro/article-abstract/24/4/383/572329/1)
acceding and candidate countries of Eastern Europe by initiating and implementing HIA case studies in various sectors.

As participants in the project, we have deemed the HIA of quality wine production to be of particular importance in the transitional situation of the Hungarian wine sector, taking the poor alcohol-related mortality data into consideration. Nevertheless, the issue has significance beyond the Hungarian situation, as it is in fact a Central-Eastern European question. The main goal of this study is to evaluate Hungarian legislation related to the wine sector and its possible future trends in order to assess the health impact of the production, supply and consumption of quality wine versus table wine. The study population comprises those engaged in wine production and marketing from the production point of view, and the entire Hungarian population on the consumption side.

METHODS

Setting

In order to elaborate a comprehensive assessment on the full scale of direct and indirect health effects of the quality wine production policy, the Health Impact Assessment Workgroup of the University of Debrecen set up a steering committee comprised of:

(i) stakeholders—representatives of policy makers and professionals of the wine sector (expert from the Ministry of Agriculture and Rural Development, wine producer)
(ii) key informants—experts from relevant fields of HIA, such as environmental and nutritional health, epidemiology, general medicine and law (members of the workgroup).

The terms of reference agreed upon after the establishment of the steering committee set the following goals:

(i) assessment of the direct and indirect health impact of quality versus table wine production through the analysis of ‘Quality wine legislation covering grape growing and wine making’ policy,
(ii) formulation of recommendations for the maximization of positive health impacts and the minimization of negative health impacts of quality wine production,
(iii) provision of conclusions on recommended methodology and on lessons learned during the HIA process.

The workgroup functioned as a team and communicated with the external experts of the steering committee during the preparation of the HIA. The quality wine producer was visited in his winery for an interview. The expert from the Ministry was also contacted for an initial interview, and thereafter remained of help with additional information and was sought out for his opinions throughout the process. The interviews followed pre-framed guidelines in order to cover all the important aspects of the matter.

Implementation

The assessment is based on the model of health presented in the Ottawa Charter of Health Promotion (World Health Organisation, 1986). The assessment embraces a range of public health and epidemiological research methods within a structural framework based on the Gothenburg Consensus Paper (European Centre for Health Policy, 1999) and the guidance of the Institute of Public Health in Ireland (Institute of Public Health in Ireland, 2006).

The key values and characteristics of HIA (Ison, 2000), which are fundamental elements of this work, are:

(i) multidisciplinary, intersectorial approach with the involvement of experts from different areas,
(ii) involvement of relevant stakeholders,
(iii) use of various methods to assess impacts,
(iv) use of existing qualitative and quantitative evidence from the published literature, routinely collected data and information obtained from stakeholders.

A comprehensive, retrospective/concurrent HIA was carried out in order to assess the impact of quality wine production focusing on related legislation that can serve decision makers in the reformulation of policy. The implementation of HIA applied the standard procedure starting with screening and followed by scoping, risk appraisal and reporting with recommendations for measures and for monitoring success.

A tool developed by the workgroup was used for the screening stage. The structure of the screening tool was modelled on the tool published by the Institute of Public Health in
Ireland (Institute of Public Health in Ireland, 2006) that had previously been used by the workgroup in the HIA of industrial developments, so its applicability had already been tested. The Irish tool was complemented with useful elements of a checklist developed by the Netherlands School of Public Health (Netherlands School of Public Health, 2001), which has considerable experience in the field (Varela Put et al., 2001), as well as with additional information on health determinants and with information based on the workgroup’s own experiences.

The risk appraisal was based on quantitative economic and health data obtained from:

(i) scientific literature identified by using PubMed,
(ii) legislation documents,
(iii) Internet sources (Google and Google scholar),
(iv) information from experts and stakeholders.

RESULTS AND DISCUSSION

For the analysis of quality wine production policy, the Hungarian legislation regulating the wine sector was reviewed. Table 1 shows one basic law and five implementing regulations that were identified as documents of interest. To consider the European perspective, the corresponding EU legislation was also studied; one basic regulation (Council Regulation (EC) No. 1493/1999 of 17 May 1999 on the common organization of the market in wine) and several implementing regulations were found.

Screening

The screening process identified health determinants relevant for the detailed assessment of quality wine production and marketing (Table 2). The selection considered two main issues: the consumption of quality wine products with all of its direct and indirect consequences, and the economic environment affecting wine producers, their employees and their land.

The affected subgroups of the population were found to be (i) addicts, (ii) economically disadvantaged and unemployed people, especially those with dependants and (iii) people with specific professions and in special locations, that is occupationally or geographically related to wine production.

### Table 1: Legislation considered in the health impact assessment of quality wine production

<table>
<thead>
<tr>
<th>Type of legislation</th>
<th>Legal document</th>
<th>Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Law</td>
<td>Act No. XVIII of 2004</td>
<td>Grape growing and wine management</td>
</tr>
<tr>
<td>Regulation</td>
<td>Decree No. 99/2004 (FVM)</td>
<td>Wine production</td>
</tr>
<tr>
<td></td>
<td>Decree No. 97/2004 (FVM)</td>
<td>Protection of origin</td>
</tr>
<tr>
<td></td>
<td>Decree No. 98/2004 (FVM)</td>
<td>Labelling of wine products</td>
</tr>
<tr>
<td></td>
<td>Decree No. 7/2007 (FVM)</td>
<td>Grape production potential, restructuring and conversion of vineyards</td>
</tr>
<tr>
<td></td>
<td>Decree No. 110/2005 (FVM)</td>
<td>Vineyard abandonment premiums</td>
</tr>
</tbody>
</table>

### Table 2: Health determinants selected for detailed assessment of quality wine production

<table>
<thead>
<tr>
<th>Category</th>
<th>Determinant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lifestyle and coping skills</td>
<td>Substance use and gambling (alcohol consumption, quality and volume)</td>
</tr>
<tr>
<td></td>
<td>Nutrition (habits)</td>
</tr>
<tr>
<td>Physical environment</td>
<td>Soil (quality)</td>
</tr>
<tr>
<td></td>
<td>Built environment and land use (change to quality wine production versus grubbing up)</td>
</tr>
<tr>
<td>Socio-economic environment</td>
<td>Income and social status (quality wine production versus abandonment of viticulture)</td>
</tr>
<tr>
<td></td>
<td>Employment and working conditions (quality wine production versus abandonment of viticulture)</td>
</tr>
<tr>
<td></td>
<td>Family cohesion</td>
</tr>
<tr>
<td></td>
<td>Social contacts</td>
</tr>
<tr>
<td></td>
<td>Culture</td>
</tr>
<tr>
<td></td>
<td>Recreation</td>
</tr>
<tr>
<td></td>
<td>Transport (accidents)</td>
</tr>
<tr>
<td></td>
<td>Crime (violence and adulteration)</td>
</tr>
</tbody>
</table>
**Detailed assessment**

**Alcohol consumption**

An increasing share of quality wine versus table wine on the market can modulate the health effects of wine consumption in two ways: by influencing composition and volume. Quality wines of controlled origin contain natural ingredients, even though the main constituent, ethyl alcohol, has predominantly harmful effects. The International Agency for Research on Cancer (International Agency for Research on Cancer, 2007) classified ethanol, just like alcoholic beverages in general, as a proven human carcinogen contributing to the development of mouth and pharynx, larynx, oesophagus, liver and probably colon and breast cancer. High alcohol intake causes increased risk for stroke, but low to moderate consumption is protective against coronary heart disease (World Health Organisation, 2003). The flavonoid components (water-soluble yellow plant pigments, polyphenols) of red wine that is fermented in the presence of grape skins can also promote human health (Opie and Lecour, 2007). Quercetin and resveratrol are both powerful antioxidants; resveratrol inhibits the oxidation of LDL, making it cardioprotective. Most epidemiological studies of the relationship between alcohol and chronic heart disease (CHD) have shown a decreased incidence of CHD among those drinking low to moderate amounts of alcoholic beverages in general, and wine in particular (Renaud and Lorgeril, 1992; Klatsky, 1999; Gronbaek et al., 2001). The risk of coronary heart disease related to the volume of consumed alcohol is described as U- or J-shaped in adults (Murray et al., 2002; Opie and Lecour, 2007). In addition, red wine polyphenols are broad-spectrum agents that can stop cancer formation in diverse ways. Resveratrol has antimutagenic activity; it interferes with cell survival programs and promotes apoptosis by blocking the expression of antiapoptotic proteins or by inhibiting signal transduction through the PI3K/ AKT, MAPK or NF-κB pathway (Uenobe et al., 1997; Fulda and Debutin, 2006). Other polyphenols, such as quercetin, catechin and gallic acid, have also been shown to inhibit the growth of various neoplasms (Soleas et al., 2002). Taking into consideration the positive and negative health effects of alcoholic beverages, their consumption should not exceed two units (one unit is equal to approximately 10 g of alcohol, that is, one glass of wine) per day according to World Health Organisation (World Health Organisation, 2003).

Consumption volume may decrease as a result of increased market share of expensive quality wines, although the advantageous health effects of moderate wine consumption can only be experienced if people drink legal, thoroughly controlled products that are produced from licensed vine varieties and meet quality criteria (Act No. XVIII of 2004, Decree No. 99/2004). Strict protection of origin (Decree No. 97/2004), designation and labelling (Decree No. 98/2004) can help counter the problem of adulteration; however, encouraging quality wine production will have a positive effect on consumers’ health only if the demand is also redirected towards these products. In this regard, health promotion can play an important role. Otherwise the increasing market share and cost of quality wines and the lessening supply of table wines might drive some people to seek illegal sources.

**Nutritional habits**

Wine drinkers generally have a healthier diet, with higher intake of fruit, vegetables and fibre than drinkers of other alcoholic beverages (Barefoot et al., 2002; Ruidavets et al., 2004; Johansen et al., 2006). The pattern of wine consumption relative to meals may also be of importance; drinking wine with meals seems to be more advantageous than drinking prior to eating (Opie and Lecour, 2007). There is little or no blood pressure increase when alcohol is consumed with meals (Stranges et al., 2004). Red wine can protect from the atherosclerotic effects of postprandial lipaemia by preventing the lipid peroxidation of LDL and NF-κB activation in peripheral mononuclear cells (Blanco-Colio et al., 2000). Wine used for cooking, like in French cuisine, can be healthy; marinating meat in red wine substantially decreases the formation of potentially toxic heterocyclic amines (Busquets et al., 2006).

The findings point out that encouraging quality wine production can be most advantageous to customers’ health if the efforts are complemented with information campaigns promoting not only moderate quality wine consumption, but also a healthy diet and lifestyle in general.
Soil quality and land use

Quality wine can be produced only on good land, so quality wine producers have to pay thorough attention not only to adequate wine-making methods but also to the best conditions for grape growing. Quality wine must derive from vineyards within a maximum yield of 100 hl per hectare (Act No. XVIII of 2004), but the limit can be even lower for wine of protected origin (Decree No. 97/2004). Furthermore, quality wine has to meet several quality criteria (Decree No. 99/2004), so plantations should be designed in a way (variety choice, replanting and modernization) that provides the best conditions for wine production (Decree No. 7/2007). If quality is promoted, the increasing demand for high standards induces the spread of integrated cultivation of plants with reasonably limited use of chemicals, and eco-farming. Chemical use can be reduced by sustaining the ecological balance of the vinery. The fight against parasites is much easier if the place and vine variety of the vineyard have been adequately chosen. The application of protective plants, predator insects and mechanical weed control can further reduce pesticide use (Kovács, 2003). Proper fertilization prior to plantation and the continuation of fertilization, preferably with farmyard and green manure from reliable sources, provide the best quality yield, especially with regular and modest supply of nutrients with balanced nitrogen, phosphorus and potassium content (Kovács, 2003). Since vineyards are frequently situated on hillsides, mindful farming can prevent soil erosion as well. The protection of the soil from pollution and erosion, and its use for quality wine production of high standards, not only allows the valuable use of land for production, but also promotes related catering activities by improving the economic conditions of wineries. However, transition towards quality wine production requires the control of production potential (Act No. XVIII of 2004) and meeting high standards requires substantial financial investment from the producers. Those who lack funds or vineyards of good quality soil would have to abandon wine-growing, a practice that is promoted by the EU’s premium for grubbing-up. In such a case, the use of the land may decline even if the owner changes the cultivation type on the grubbed-up land so that it does not stay out of cultivation (Decree No. 110/2005).

Table 3: Number of vineyards in Hungary by type of ownership

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2003</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise</td>
<td>316</td>
<td>543</td>
<td>614</td>
</tr>
<tr>
<td>Private farmer</td>
<td>197489</td>
<td>194982</td>
<td>149571</td>
</tr>
</tbody>
</table>

Source: Hungarian Central Statistical Office.

The health effects of environmentally sound farming that includes the protection of soil against pollution, overuse of chemicals and erosion are definitely positive. High value land use also has a positive impact on health through increased income and employment; however, abandoning wine-growing and changing cultivation type may have opposite consequences.

Income and employment

Grape growing and wine production provide complete or partial subsistence for many people in Hungary. There are around 150 000 private farmers and over 500 enterprises that own vineyards (Table 3). The number of those employed in wine producing enterprises with more than four employees (close to 30% of such enterprises) is about 4000 (Agricultural Economics Research Institute, 2007); this shows that the Hungarian wine sector is dominated by small, family-based ownership and operation. Those areas where the largest wine producing regions are situated can mostly be characterized by higher unemployment rates than the country’s average (Table 4). Quality wine production can improve the producers’ economic conditions by providing domestic and external markets and, consequently, increased income. The loss of external markets after the political transition was confined mainly to the post-soviet states, because of their market disturbances and the demand for low-quality table wine. The main factor in customers’ choice in this wine category is price, and the Hungarian producers could not compete with other cheaper sources (Sidlovits, 2005). As a result, 80% of Hungarian wine export is now directed to EU countries, where quality considerations are more important. According to experts, the wine consumption pattern of the world will move towards higher demand for quality products (Szakál, 2006); the demand for quality wine is already increasing in the Hungarian market (40–50% market share in trade, even higher in hypermarkets).
The structural change toward high standards of production (restructuring and conversion) is subsidized (Decree No. 7/2007), but the several improvements required to meet strict rules and quality criteria (Decree No. 99/2004) require substantial funds beyond premiums. The competition with quality products from other EU countries and nowadays increasingly from ‘new’ wine producers overseas (Australia, Chile, South Africa etc.) is intense not just on the external but also on the domestic market (Sidlovits, 2005). Effective participation in this competition and the use of wine marketing channels (dominated by multinational commercial companies) require a stable financial background or cooperation, that is coordination of production and marketing (Sidlovits, 2005; Szakáll, 2006). In Hungary, several producers are capital-scarce private farmers with small vineyards, and efficient cooperation between wine producers is still very rare. Although the Inland Revenue laid on wine selling was recently converted to marketing contribution to be used for quality control and public marketing of products (Szakáll, 2006), those who are not able to meet the new requirements may lose their source of subsistence, since the abandonment premium (Decree No. 110/2005) provides only temporary help. Nevertheless, those wineries that can successfully manage their transition to the production of high quality products will develop economic power and also the need to employ more workers, even if quality wine production requires high standards of hygiene and precision that require the improvement of technology and automation in vineyard cultivation and wine production.

The health impact of employment and increased income is complex. In general, positive effects are to be expected from providing opportunity for improved living conditions (housing, nutrition and recreation). Life expectancy has been shown to correlate linearly with income (Woods et al., 2005). Low income is associated with high mortality (Backlund et al., 1996) and low physical and mental status. One of the main effects of increased wealth is improved self-esteem and social status (coping); however, these effects usually manifest themselves in the long term (Blakely et al., 2000). Higher earnings for local communities deriving from economic development can increase their potential to improve the level of social services, which also affects health positively. On the other hand, increased income provides surplus opportunity for unhealthy behaviours (abundant diet, smoking, alcohol consumption etc.).

Family cohesion and social contacts

Family cohesion and social relations may progress with improved social status based on the employment opportunities and increased income provided by a prosperous wine sector. Considering the consumption aspect, alcohol drinking is an important factor in domestic violence. Seven out of ten perpetrators and 40% of aggrieved persons in Hungary were under the influence of alcohol (Hungarian Police, 2005). Parents’ alcoholism spoils family life; it is one of the most important causes for the disintegration of families. Alcoholism breaks up social relations and harms job performance. If an increased supply of quality wine causes a gradual change in customer preference towards quality products and reduced volume, improvement of family cohesion and social relations, as well as increased workplace performance, may be expected.

Culture and recreation

Quality wine production makes substantial contributions to patronizing ‘wine culture’, which integrates the protection of quality and origin. It helps to build an image and cultivate fame, and to improve the ways in which wine is produced and consumed. Prosperous producers of quality wine may have the financial background, knowledge and attitude to join wine tourism and use their own catering facilities where guests can taste, consume or purchase wine near

Table 4: Unemployment rate in Hungary by region, 2006

<table>
<thead>
<tr>
<th>Region</th>
<th>Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Hungary</td>
<td>5.1</td>
</tr>
<tr>
<td>Central Transdanubia</td>
<td>6.1</td>
</tr>
<tr>
<td>Western Transdanubia</td>
<td>5.7</td>
</tr>
<tr>
<td>Southern Transdanubia</td>
<td>9.0</td>
</tr>
<tr>
<td>Northern Hungary</td>
<td>11.0</td>
</tr>
<tr>
<td>Northern Great Plain</td>
<td>10.9</td>
</tr>
<tr>
<td>Southern Great Plain</td>
<td>7.8</td>
</tr>
<tr>
<td>National average</td>
<td>7.5</td>
</tr>
</tbody>
</table>

Source: Hungarian Central Statistical Office.
Regions with the largest wine production areas are indicated in bold.
its source. Such activity can produce extra benefits directly as an extra source of income, and also indirectly as an efficient method of marketing products. Beyond the positive health effects of increased income, the sophisticated, moderate consumption of quality wine in a pleasant environment with additional cultural and recreational opportunities would have a favourable impact on consumers’ health as well.

**Transport**

The risk of road traffic accidents is substantially higher for drivers under the influence of alcohol, due to lengthened reaction time and impaired coordination. Although the number of road accidents with injuries decreased by 1% from 2005 to 2006 in Hungary, the number of those traffic accidents caused by drunk drivers rose by 6% and their share in road accidents increased from 12.43 to 13.29% (National Police-Office, 2007). Road traffic accidents related to drunk driving may decrease with the spread of mindful alcohol consumption; however, such a change of public behaviour requires time and extensive promotion programmes.

**Crime**

A total of 25% of investigated cases of crime are committed under the influence of alcohol; the role of alcohol has increased in violent and truculent crime in Hungary (National Strategy of Public Crime Prevention, 2003). The adulteration of alcoholic beverages, like wine, is also a problem. The illegal production and trade of wine, at around 600 000 hl a year (Szakál, 2006), reduces Inland Revenue and distorts competition on the market; moreover, it can finance criminal groups and present risks to consumers’ health. The promotion of quality wine production can have a positive effect on people’s health if the strict control of production and trade and the fight against adulteration and fraud are effective.

**CONCLUSION**

Wine production and consumption act upon the health status of the Hungarian population in various ways. The wine sector, having cultural and economic importance, provides subsistence for many people in Hungary. On the other hand, it faces several vital problems and challenges due to the need for restructuring and modernizing the fragmented sector, which is short on resources, as well as to the country’s accession to the EU (Sidlovits, 2005; Szakál 2006). The health consequences of alcohol consumption are also a considerable problem in Hungary (Szűcs et al., 2005; Ádány, 2006); therefore, a comprehensive HIA of quality wine production through the evaluation of related Hungarian legislation was deemed to be of particular interest.

Elaborating HIAs of polices is far from everyday routine in Hungary. It is a complex task, since several direct and indirect effects must be identified and analysed in a multidisciplinary manner. In this regard, the scoping phase of the HIA, especially the establishment and adequate management of a steering committee, was of crucial importance for the successful collection of data, for understanding the mechanisms of the wine sector and for the interpretation of results.

The HIA of quality wine production policy has identified several positive and negative impacts. Quality wine production allows improved use of land and creates employment opportunities. It increases the incomes of producers and local communities, but capital-scarce producers unable to manage restructuring may lose their source of subsistence. The toxic effects of alcohol consumption can be reduced via an increased supply of controlled quality wine and decreased consumption volumes due to rising cost, although increased costs might drive some people to seek illegal sources. Quality wine supply can promote social relations, contribute to healthy lifestyles and reduce risk behaviour and criminality related to alcoholic influence and adulteration. Identified changes in the determinants of health are expected to influence health outcomes, especially morbidity and mortality due to external causes and alcohol-related diseases (chronic liver disease and cirrhosis, cancer of the oesophagus and larynx and alcohol dependency syndrome).

The assumed overall advantageous impact can only be experienced if positive health effects are maximized and negative effects are minimized. To obviate the unwanted consequences of quality wine production and supply, effective health promotion programmes targeting wine consumption are essential, together with the prudent management of the transition
of the wine sector by helping producers and formulating pricing policy. Recommendations for gaining the highest health benefits related to the assessed health determinants are given in Table 5.

To determine the effectiveness of these predictions, a wide range of indicators are proposed for monitoring (Table 6). Changes in wine production are to happen in a relatively short-term time frame after an effective restructuring programme begins. However, alterations in the patterns of alcohol consumption and nutritional habits of the population may be expected only on the medium-to-long term; this would then be followed by the improvement of health and crime statistics. Therefore, it would

**Table 5: Recommendations for the maximization of positive and minimization of negative health effects of quality wine production**

<table>
<thead>
<tr>
<th>Health determinant</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land use and soil quality</td>
<td>Financial support for conversion, especially for those areas where highest quality improvement can be predicted. When producers of poor quality wine cannot effectively manage conversion and give up their activity, the land use should be thoroughly checked so as not to leave former vineyards out of cultivation.</td>
</tr>
<tr>
<td>Income and employment</td>
<td>Initiation and effective financial support for coordination in production and marketing and conquering external markets. Providing grubbing up premium only in those cases when conversion is not feasible.</td>
</tr>
<tr>
<td>Culture and recreation</td>
<td>Advertising wine tourism and the ‘culture’ of wine consumption. Help for wine producers to establish catering facilities and to join wine tourism.</td>
</tr>
<tr>
<td>Alcohol consumption</td>
<td>Reinforcement of control of the quality and sources of wine. Health promotion campaign about the importance of the source, quality and daily quantity of consumed alcoholic drinks, preferably wine. Prudent pricing policy to avoid increasing the demand for illegal products.</td>
</tr>
<tr>
<td>Nutrition</td>
<td>Advertising healthy diet and cooking practises to accompany favourable wine consumption. Social programs against alcoholism and domestic violence, and supporting family protection.</td>
</tr>
<tr>
<td>Family cohesion and social contacts</td>
<td>‘Do not drink and drive’ campaigns in parallel with advertising of favourable wine consumption habits. Rigorous control on the roads.</td>
</tr>
<tr>
<td>Crime</td>
<td>Fight against adulteration and violent crime committed under the influence of alcohol.</td>
</tr>
</tbody>
</table>

**Table 6: Indicators proposed for monitoring the effects of the health impact assessment**

<table>
<thead>
<tr>
<th>Health determinant</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land use and soil quality</td>
<td>Vineyard area, ownership of vineyards. Wine production, extent of quality wine production. Wine export, import.</td>
</tr>
<tr>
<td>Income and employment</td>
<td>Profitability of wineries. Number of wine producers who gave up activity. Number and income of employees in the wine sector.</td>
</tr>
<tr>
<td>Culture and recreation</td>
<td>Number of tourists participating in wine tourism. Income from wine tourism.</td>
</tr>
<tr>
<td>Nutrition</td>
<td>Share of fruit, vegetables and fibre-rich nutrients in diet.</td>
</tr>
<tr>
<td>Family cohesion and social contacts</td>
<td>Annual number of investigated cases of domestic violence committed under the influence of alcohol.</td>
</tr>
<tr>
<td>Transport</td>
<td>Annual number of investigated cases of domestic violence committed under the influence of alcohol or related to the adulteration of wine.</td>
</tr>
<tr>
<td>Crime</td>
<td>Annual number of investigated cases of crime committed under the influence of alcohol or related to the adulteration of wine.</td>
</tr>
</tbody>
</table>
be reasonable to conduct the summarization of annually collected data and the analysis of trends after the first 5 years, and then, depending on the findings, every 3–5 years.

This work is one of the first examples of HIA of policies in Hungary. The incorporation of HIA in the preparation phase of policies would require the routine identification of regulations that are candidates for such assessment. Pre-screening tools may prove to be useful in the initial selection process performed by civil servants, while comprehensive HIA should be carried out by invited expert groups. Such a mechanism could provide a highly effective consideration of health issues in the legislation process, which could subsequently affect the health status of the Hungarian population in a positive way.

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