

TRENDS AND PATTERNS

OF ALCOHOL CONSUMPTION
IN SRI LANKA 1981-2017

Analyses of Sales and Survey Data

ADIC
Alcohol and Drug Information Centre

**NATA**
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National Authority on Tobacco & Alcohol

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NARKOTIKAUPPLYSNING



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by

Dr. Håkan Leifman

ADIC
Alcohol and Drug Information Centre



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FOREWORD

In the last six months, NATA (National Authority on Tobacco and Alcohol) and CAN (Swedish Council for Information on Alcohol and Other Drugs) have worked together on the development of a monitoring system with accessible and analysable data on alcohol and tobacco. Some basic and important data is now available for regular monitoring and for epidemiological and policy relevant studies. The data was collected in collaboration with ADIC (Alcohol and Drug Information Centre). Most of the analyses were also conducted at ADIC which was Leifman's (Director of CAN) main workplace during his stay in Sri Lanka September 2017 to March 2018.

The development of a national monitoring system on alcohol and tobacco (and other drugs) will continue throughout 2018 and 2019. Such a monitoring system will greatly improve the understanding of the dynamics of alcohol and tobacco trends, such as changes in consumption and in various harm rates. It will also make it possible to analyse the impact of different policy changes on the consumption.

This study is the result of that work and, hopefully, the first of a series of forthcoming reports on studies on different aspects of alcohol and tobacco epidemiology as well as on prevention and policy strategies in Sri Lanka.

To the best of our knowledge, no similar study has previously been conducted on Sri Lankan alcohol data highlighting as many different aspects of alcohol consumption by means of multiple data sources. Among other things, the study shows that the per capita alcohol consumption has been reduced by 16% from the peak in year 2012 to year 2017. This is positive news and shows that the long-term upward consumption trend, starting from at least 20 years ago, may have been broken.

It is with great pleasure that we hereby publish this first report and hope that the readers will find it highly interesting and instructive.

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Dr. Håkan Leifman

Executive Director of ADIC
Mr. Pubudu Sumanasekara

Chairperson of NATA
Dr. Palitha Abeykoon



SUMMARY

AIM

The study has two main aims. The first is to describe and analyse the per capita alcohol consumption in Sri Lanka over the past 35 years, with a primary focus on the latter part of the period (2000-2017). Both consumption levels as well as beverage specific consumption trends were studied.

The second aim is to analyse the regional trends (by district and province) from 1998 to 2016. A special attention is on whether or not the differences in consumption levels across the regions and provinces are decreasing over time (i.e. converging).

MATERIAL AND METHODS

The main variable (or indicator) studied is the recorded alcohol consumption in Sri Lanka which covers the sales of all main alcoholic beverages sold in on- and off- licensed premises. Other alcohol consumption data are analysed as well, mainly in order to get a better understanding of whether or not the recorded consumption trends seems reasonable and are in concordance with the findings from these other data.

One such data is unrecorded consumption which is alcohol consumption not accounted for in official statistics on alcohol taxation or sales. The main part of this consumption consists of kasippu which is an illicitly produced spirit. This study takes a closer look at the data and statistics available and try to roughly assess the impact kasippu may have on consumption estimates as shown by the recorded consumption.

Being a popular tourist destination, there is a general belief that the alcohol consumption by tourists in Sri Lanka will lead to a substantial over-reporting of the actual alcohol consumed by Sri Lankan inhabitants. Therefore, this study estimates the litres of alcohol consumed by tourists and relates the estimates to the total Sri Lankan recorded consumption. A minimum, middle and maximum impact estimate of the tourists' share of the total recorded consumption is presented.

Another data source is drinking of alcohol assessed by general population surveys on the adult Sri Lankan population. Most of these questions, and results published, relates to the drinking frequency of any alcoholic beverages (irrespective of which kind, including kasippu). This study investigates the results obtained in different general population surveys conducted since 2002. The latest one is from 2015.

By combining total consumption data (i.e. recorded plus estimates of unrecorded) and general population (survey) data, the per capita consumption and consumption per drinker for men and women are estimated. The estimates presented in this study are compared with the current WHO-estimates for Sri Lanka.

Regional recorded consumption trends are studied with main focus on whether or not the regions (districts and provinces) show similar trends over the years and whether or not the differences in consumption levels between the regions are diminishing over time.

RESULTS

This study shows that the recorded consumption peaked in 2012 and has thereafter decreased almost year by year. In 2017, the consumption reached 2.4 litres of pure alcohol per capita aged 15 and above (15+), which is a 16% decline compared to 2012 (2.9 litres). Beer explains a large part of the increase from 2009-2012 and also the entire decrease from 2012 to 2017. The biggest drop in beer consumption took place during one year, i.e. from 2015 to 2016 (0.60 to 0.34 litres of pure alcohol). In addition, regional data shows that almost all regions follow the national trend, i.e., an increase from 2000 to 2012 (especially 2009-2012) and then a stable or a decreasing trend in many districts and provinces.

Seen from a longer time perspective, the consumption has increased rather steadily from about 1.0 litre in the 1980s, 1.5 litres in the 1990s, 2.0 litres in 2006 to 2.9 litres in 2012. The decline of 2012-2017 (to 2.4 litres in 2017) is the only declining trend during the study period lasting for more than two years.

Another important finding is that the differences in consumption levels between districts and provinces diminish over the study period, from 1998 to 2016, mainly as a result of initially low-consumption districts approaching the levels of the districts with overall higher, but steadier, consumption levels.

Data on drinking frequencies obtained from general population surveys conducted before and after the end of the armed conflict in 2009 confirm our finding of a sharp increase in consumption after 2009 until 2012, followed by a decrease. Unrecorded kasippu consumption and the tourists' consumption in Sri Lanka do not change this picture, although the total consumption is higher than the recorded consumption.

According to the WHO database GISAH, the total alcohol consumption in Sri Lanka is roughly 4 litres of pure alcohol per capita ages 15 and above (at the most), both in 2010 and in 2015. Based on this level of 4 litres (2.5 litres recorded and 1.5 litres unrecorded), the total consumption for men and women and per male and per female drinker is estimated in this study. Since men account for almost all alcohol consumption, the male per capita consumption is almost 8 litres and since 50% men consume alcohol during a 12-month period (current drinkers according to the WHO estimate), the male consumption per drinker reaches an estimated 16 litres. Very few women drink alcohol (1.8% according to the latest study from 2015), the female per drinker consumption reaches at the most 2.8 litres of pure alcohol.

The reason for stating that the total consumption is at the most 4 litres is that it is based on a doubtfully high kasippu consumption level of 1.5 litres of pure alcohol per capita aged 15 and above. We have not seen any evidence of such a high level and there are reasons to interpret this figure very cautiously. Starting from 4 litres also affects the estimated men's and women's consumption per drinker (e.g. 16 litres per men drinker). Therefore, this study has also estimated the total consumption for men and women starting with other unrecorded (kasippu) estimates (namely 0.3 and 0.5 litres of pure alcohol which have been mentioned by different actors in the field). In addition, ADIC's Spot-surveys have been analysed in order to estimate the frequency of kasippu drinking in relation to arrack, and then this ratio was used in a calculation of the total kasippu consumption in relation to arrack and total alcohol consumption. These calculations indicate a significantly lower level of kasippu consumption than 1.5 litres.

DISCUSSION

This study has, among other things shown that the increase in per capita recorded alcohol consumption over the study period occurred in all provinces and in all districts. On national level, the per capita consumption increased more or less steadily until 2012 and has thereafter declined (until 2017). Data on drinking frequencies obtained from general population surveys conducted before and after the end of the war corroborate this finding of a sharp increase in alcohol consumption after the end of the armed conflict until 2012 followed by a decline.

Further analyses conducted in this study indicate that estimates of unrecorded kasippu consumption and tourists' consumption in Sri Lanka, most likely, do not change this picture of increasing consumption and, the decreasing consumption trend of the past few years more than marginally. While this is an important finding better assessments of the size of unrecorded alcohol consumption are still needed. One such promising attempt is the forthcoming WHO STEP-survey which will probably take place in 2019. In the STEP-survey questionnaire, items of unrecorded and beverage specific total consumption is included which will make it possible to estimate the size of unrecorded kasippu consumption in relation to the total consumption. It will then also be possible to compare this estimate with the WHO-estimate of 1.5 litres per capita (15+) unrecorded consumption.

Other important findings in this study are the estimates of the per capita male and female consumption and per drinker male and female consumption. Particularly the per drinker estimates are important since they are substantially lower than what is incorrectly reported by the WHO (e.g., WHO, 2014). This picture of the drinking levels among men and female drinkers in Sri Lanka has not previously been communicated.

Since this study has a descriptive approach it is beyond the scope to find different causal explanations to the reported consumption trends. This will, however, be the aim of forthcoming studies.



INTRODUCTION

Alcohol is a psychoactive substance with dependence producing properties and a risk factor for numerous health and social problems (Babor et al., 2010; World Health Organization, 2015). As a consequence, many countries worldwide have adopted different prevention policies and programmes to prevent harm from alcohol (e.g. Babor, et al., 2003; World Health Organization, 2012, 2014).

This holds true also for Sri Lanka. Alcohol is sold both on- and off-licensed premises but with restricted opening hours (retails shops: 12 hours from time of opening. Special license is required to operate beyond 11 pm), high age-limits (21-year limit), rather low density of licensed premises and high taxes on alcoholic beverages. These are considered to be among the most effective policy instruments (Babor et al., 2003; World Health Organization, 2012). Sri Lanka also employs a vast variety of demand reduction interventions conducted by both national agencies and NGO's.

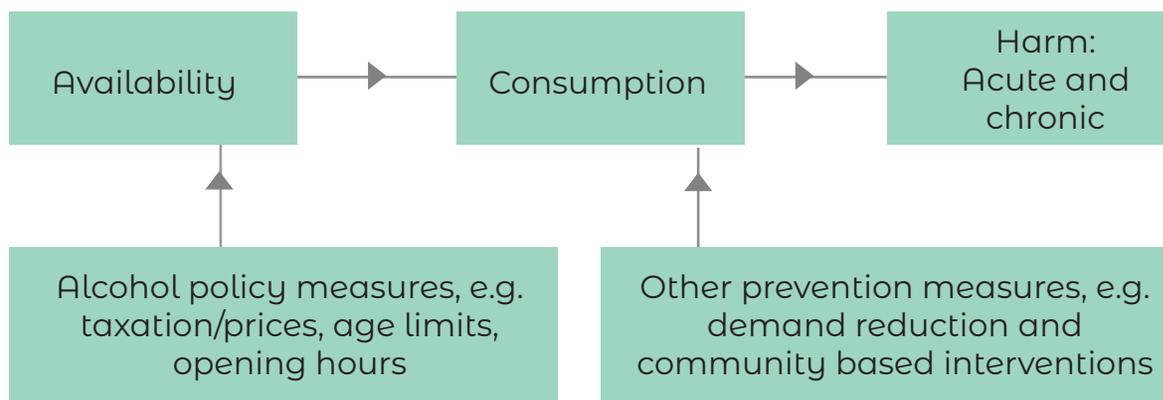
Sri Lanka has a completely different alcohol culture than in the western world where almost all epidemiological and prevention and policy studies have been conducted. Basic information on level and changes in taxation, pricing of different alcoholic beverages and outlet density is not routinely reported. Furthermore, despite some recent studies in the field (e.g. Katulanda, et al., 2014; Somatunga, et al., 2017), little is known about the drinking patterns, drinking trends and the development of alcohol related harm in Sri Lanka. Thus, Sri Lanka suffers from a large deficit on easily accessible basic alcohol statistics or what is usually defined as alcohol indicators.

However, a national monitoring system is under construction, under the direction of NATA and in collaboration with the Swedish organisation CAN. The construction of this system takes time but some basic statistics have already been compiled. Eventually, it will encompass indicators on policy measures (taxation/prices, number of licenses to sell and serve alcoholic beverages, age-limits, opening hours), consumption levels, consumption patterns and alcohol-related problems.

Figure 1 displays the monitoring system for alcohol within a broader, but simplified public health perspective. Briefly stated, changes in consumption (levels and/or patterns), which may vary due to policy changes such as the availability of alcohol and/or demand reduction interventions, in turn changes the problem rates, both acute (e.g. alcohol poisoning, accidents, violence) and chronic (e.g. liver diseases, pancreatitis). The model shown in figure 1 gives a simplified picture of the determinants but has been proven valid in many countries with different cultures and views on alcohol (see e.g., Babor, et al., 2010; WHO, 2014). A monitoring system should focus on this basic approach and include relevant indicators.

In this report, the focus will be on a few of these indicators, from the same domain, namely the consumption of alcohol, and particularly the consumption as measured by sales in on-and off-licensed premises. This indicator is usually defined as the recorded alcohol consumption. It is a widely used indicator for monitoring alcohol consumption in most countries around the world and also regularly reported by WHO (see WHO, 2014 and WHO's database system: Global Information System on Alcohol and Health). The rationale for focusing on such an indicator is its impact on alcohol-related harm. (WHO, 2014).

Figure 1. A simplified alcohol-specific public health model (often referred to as the total consumption model). (availability = physical as well as economic availability)



In most countries the recorded consumption is not equivalent to the total consumption since all consumption is not accounted for in official statistics on alcohol taxation or sales (see e.g. WHO, 2014). Therefore, this study will assess whether or not other relevant consumption data, based on sources other than the recorded consumption, are in line with the findings on the trend analyses on the recorded alcohol data.

One of these other data is unrecorded consumption. In Sri Lanka this mainly consists of illicitly produced arrack/spirit called kasippu. Another part of the consumption which may bias the results of analyses on recorded consumption is tourists' consumption in Sri Lanka. This may, contrary to kasippu, lead to an overestimation of the recorded consumption per Sri Lankan inhabitant. Therefore, estimations of tourists' alcohol consumption in Sri Lanka are analysed.

Another type of consumption data analysed in this study is, drinking according to general population surveys conducted over the years. These data are from studies conducted 2007, 2012 and 2015, and to some extent from 2002 and 2005/2006 as well. These surveys include questions on drinking of alcohol irrespectively of what kind of alcohol that is consumed (e.g. legal or illegal). In addition, in contrast to sales data, these data can be broken down in different subgroups, such as gender and age.

Thus, the main reason for analysing these sources, other than record consumption, is to get a better understanding of whether or not the recorded consumption trends seems reasonable and are in concordance with the findings from these other data.

The study has two main aims:

1. To describe and to analyse the per capita alcohol consumption in Sri Lanka over the past 35 years with a primary focus on 2000-2017, through analysis of both consumption levels and beverage specific consumption trends.
2. To analyse the regional trends (district wise and by Province) from 1998 to 2016 with a special attention on the homogeneity of consumption trends across the districts and provinces. A main question is whether or not the trends are more or less the same between districts and between provinces. A second, and related, question is whether or not the regional consumption levels show an increased degree of convergence over the years.

The next chapter will describe the data and the analytical approach, followed by the results section and a discussion and summary section.

MATERIAL AND METHODS

The study variables are presented in detail in table 1. The main variable, or indicator, over the alcohol consumption in Sri Lanka – recorded consumption – covers the sales of all main alcoholic beverages in Sri Lanka sold in on- and off licensed premises. All sales data from 1981 to 2016 are retrieved from the Excise Department's annual reports (e.g. Excise Department, 2016). The 2017 data has been given to us in paper before publication in the 2017 annual report. The sales data for each alcoholic beverage are presented in volume litres.

In this study, all volume litres are converted into pure (100%) alcohol according to the following conversion factors for each beverage: arrack: 33.5% (i.e. alcohol strength or alcohol by volume (ABV)), spirits (about 38% but with some variations, e.g. whisky: 40%, brandy: 38%), wine: 12%, toddy: 7%. These ABV are applied for each beverage every year after consultation with the Excise Department. For beer, however, the exact percentage ABV is calculated for each year from 2001 to 2017 since production figures on beer with a high alcohol content (8.8% ABV) and beer with a low alcohol content (4.8% ABV) are available for those years. The weighted average of these sales volumes for these two categories of beer (4.8 and 8.8 respectively) is used for each year. Before 2001 no such data is available and therefore the alcohol strength for 2001 (6.5% ABV) is applied during the period 1981-2000. All the sales data for each beverage and year is shown in the appendix.

For one or several beverages data are missing for certain years in certain districts. This concerns especially the most northern districts which were involved in the civil war ending in 2009. The war had been going on for more than 30 years. For two of these districts – Kilinochchi and Mullativu no data is available until 2010. For the others – Jaffna, Vanuvia and Mannar – data are sporadically missing for some beverages in some years. Therefore, consumption trends are presented both including and excluding data from these northern districts.

Furthermore, the measures on recorded consumption used in this study are all standardized for population size nationally and regionally (districts) by dividing the consumption volumes (in 100% alcohol) by the population aged 15 or more (aged 15+, also denoted as 15+).

The recorded consumption does not cover all the alcohol consumed in Sri Lanka. The main part that is not covered – unrecorded consumption – is the consumption of kasippu, which is an illicitly produced arrack/spirit. There is no consensus on the size of kasippu consumption and different estimates (or guesses) are mentioned. Therefore, the data and statistics available were closely investigated in order to roughly assess the impact it may have on consumption trends indicated by the recorded consumption.

In 2016, more than 2 million tourists visited Sri Lanka spending almost 21 million days in the country (Sri Lanka Tourism Development Authority, 2017). The alcohol consumption by tourists will lead to an over-reporting of the actual alcohol consumed by Sri Lankan inhabitants. Therefore, the litres of alcohol consumed by tourists are estimated and the estimates will be related to the total recorded consumption. The estimates are based on the number of tourists who visit Sri Lanka, the average amount of days they spend in the country, and assuming that they drink (1) the same amounts or (2) double or (3) three times more than on average as in their countries of origin (estimates based on per capita consumption of recorded plus unrecorded alcohol). This yields a minimum, middle and maximum impact estimate of the tourists' share of the total recorded consumption. This estimation procedure (using average per capita consumption of the tourists' country of origin) follows the WHO estimation method used by WHO (WHO, 2018).

The opposite effect, namely that of Sri Lankan inhabitants drinking alcohol while being abroad is not possible to estimate. On the other hand, Sri Lankan inhabitants are spending much less number of nights abroad than tourists spend in Sri Lanka. Most likely, the size of this amount of alcohol cannot be more than marginal. However, no data is available in order to show whether this really is the case or not.

Survey data on alcohol consumption carried out in Sri Lanka is mostly based on questions to respondents (representative to the Sri Lankan adult population) about drinking frequency of alcohol irrespectively of which beverage. Thus, the results should include consumption of any alcoholic beverage, including kasippu. As a matter of fact, at least in some of the surveys studied, the actual drinking questions mention kasippu as one of the examples of an alcoholic beverage. (For example, the STEPS-survey 2015 asks the following first question: Have you ever consumed any alcohol such as arrack, kasippu, toddy, beer, spirits or wine. Showcard was used to show examples of different beverages.

In contrast to sales data, self-reported survey data can also be broken down to subgroups such as gender and age groups. A limitation is that underreporting and non-respondents may bias the data. This study takes a closer look at the results obtained in different general population surveys conducted since 2002. Each of these surveys are mentioned in more detail in the result section (table 7).

Presently, only the first indicator in table 1 – the recorded alcohol consumption – is sufficiently well developed in order to be used as an indicator in the monitoring system. The others are also important, but are not yet sufficiently developed (especially the unrecorded consumption of kasippu) in terms of methodology, standardisation and regularity in monitoring. Therefore, currently these measures cannot be used as final indicators on a regular basis.

Table 1 gives more details of the data used in this study. Some additional information is presented in the result section.

Table1. Alcohol consumption indicators/measures in the study.

INDICATOR	DEFINITION	DATA	SOURCE	DEGREE OF AGGREGATION	COMMENTS
Recorded alcohol consumption	Total and beverage specific sales of alcoholic beverages in litres of pure (100%) alcohol per inhabitant (15+).	Sales data from retail shops and from restaurants/ pubs/ bars and similar on-licensed premises. Time period: National level: 1981-2016/2017. District level: 1998-2016. All sales data are presented in volume litres in the Annual reports from the Excise Department.	Annual reports from the Excise department (tables: Statements of consumption, e.g. Excise department, 2017.)	National and district levels	The three most northern districts – Jaffna, Mullativu, Kilinochchi– lack data fully or partly before 2010. Population aged 15+ per district is estimated and based on published district-wise mid-year populations and the censuses conducted in 1980, 2001, 2012 Not developed but such a work should be initiated.
Unrecorded alcohol consumption	Consumption of alcohol from alcohol production, sales and/or consumption not tracked (recorded) by official taxation statistics, production or sales. In litres of pure alcohol (100%) per inhabitant aged 15 and over. In SL this consists of kasippu an illicitly home distilled/home brewed spirit (arrack)	No such data exist in order to make such specific estimations. Different survey data have assessed the prevalence of kasippu. And WHO presents estimated volumes of unrecorded consumption fore, SL in 2005, 2010 and, 2015.	From ADIC's Spot-survey, WHO's, database (GISAH) Lifetime prevalence estimates from WHO/ NCD-survey 2007 (see definition).	National	Not developed but such a work should be initiated.
Self-reported alcohol consumption	Self-reported alcohol consumption in the population according to general population surveys. In this study, the following questions will be analysed. 1. Have you consumed any alcohol within the past 12 months? 2. During the past 12 months, how frequently have you had at least one standard alcoholic drink? 3. When you drink alcohol, on average, how many drinks do you have during one day? 4. Have you consumed any alcohol within the past 30 days? Q 1-2 and 4 are, more less, similar in all three main surveys analysed (see next col.) Q3 only asked in one of the three (2017). Alcohol is defined by mentioning different types of beverages, including kasippu.	Mainly from three general population surveys: 1. 2007-year WHO/NCD STEPS-survey in 2007 2. National Alcohol use prevalence study done in 2012 3. 2015 year WHO/NCD- STEPS-survey 4. ADIC's Spot-survey for different years in order to retrieve drinking frequencies of arrack and kasippu.	Published data: 1. STEPS-survey 2007: Ministry of healthcare and nutrition. Sri Lanka, 2008 2. National Alcohol use prevalence study (2012): Somatunga et al., 2014 3. Ministry of Health, Nutrition and Indigenous Medicine and WHO, 2015. 4. Spot-surveys: raw data accessible for analyses.	National	Not developed but the STEPS-survey 2018 could be the first proper baseline done. So far, few studies done and the degree of comparability is limited. No estimate of the per capita consumption in total and per beverage has been published but the STEPS-survey 2015 includes all relevant questions.

Analytical approach

First, national recorded consumption trends are presented. Both total and beverage specific trends are shown. Two districts – Mullativu and Kilinochchi - lack data completely for 1998 and 2001-2009 and have incomplete data for 1999 and 2010. As for Mullativu, no data is presented for 2013-2015, either because there are no sales since the districts have few or no licensees or because of lack of reported sales data. For these years, the consumption for Mullativu has been estimated based on the sales in 2012 and the overall trend for the remaining country for 2013-2015 compared to 2012.

Furthermore, the whole Northern Province, consisting of five districts was more or less engaged in the war which ended in 2009. This may have led to less valid reported consumption data for the whole district. Therefore, consumption trends of the whole country (25 districts) will be compared to the consumption trends for 23 districts (excluding Mullativu and Kilinochchi) and 20 districts (excluding all five districts in the Northern Province).

Next, unrecorded consumption is scrutinised, including both estimates of kasippu and tourists' consumption in Sri Lanka. This is followed by analyses of self-reported consumption estimates obtained in the general population survey. Most of these analyses are based on published figures found in different national reports and estimates from the WHO database (GISAH).

The second part of this report will focus on the recorded consumption trends on district and provincial level. One aim is to outline the general trends in beverage preferences and especially in aggregate alcohol consumption across regions. The emphasis is on the dispersion over time among the districts. This gives an overview of all the districts but do not highlight individual districts. Another aim is therefore to more closely study these trends and to analyse the development for different groups of districts, in this case the nine provinces.

Two dispersion measures are used in order to calculate the differences (dispersion) between the districts over time in alcohol consumption and beverage preferences. One is the coefficient of variation (CV), a relative dispersion measure expressing the standard deviation in relation to the mean, in per cent. Since the CV tends to decrease when the mean value increases and the absolute variation is relatively constant, the standard deviation (SD) will also be presented, referring to the absolute dispersion measures. For instance, if the districts involved show upward trends in per capita consumption but the absolute differences remain intact, the CV will decrease but the SD will remain the same. If the upward trend is combined with less absolute differences, the SD is also reduced.

RESULTS

PER CAPITA ALCOHOL CONSUMPTION (LITRES OF 100% ALCOHOL)

Figure 2 shows the Sri Lankan recorded consumption trends of each alcoholic beverage and for all beverages summed up, i.e. total consumption, during the period 1981-2017. With the exception of a few years, the recorded consumption has increased steadily. Two periods with particular sharp degree of increase stand out. One is 1989-1995, the other 2009-2012. The former consists of an increase in arrack consumption, the latter of an increase in beer consumption.

The total recorded consumption reached a peak in 2012 and has thereafter declined, from 2.9 litres in 2012 to 2.4 in 2017. The decrease since 2012 is the result of a substantial drop in beer consumption by 48% and almost the entire drop occurred from 2015 to 2016 (from 0.60 in 2015 to 0.34 litres of pure alcohol in 2016). All other beverages have remained on approximately the same level in 2017 compared to 2012 or have actually increased somewhat.

During the past 20 years or so, all beverages show increases. Beer consumption increased from 0.06 litres in 1995 to 0.67 litres in 2012 and then decreased to 0.37 litres in 2017. In absolute terms, arrack shows the biggest increase, from 1.35 litres in 1995 (1.16 in 1996) to 1.81 litres in 2017. The drop in arrack consumption from 1995 to 1996 is probably due to a substitution effect from arrack to beer in connection with a significant drop in the beer taxation in 1996 (from 32 Rupees in 1995 to 10 Rupees in 1996 for one litre of beer) and a minor increase in the arrack taxation during the same year (from 156 to 178 Rupees for one litre of arrack).

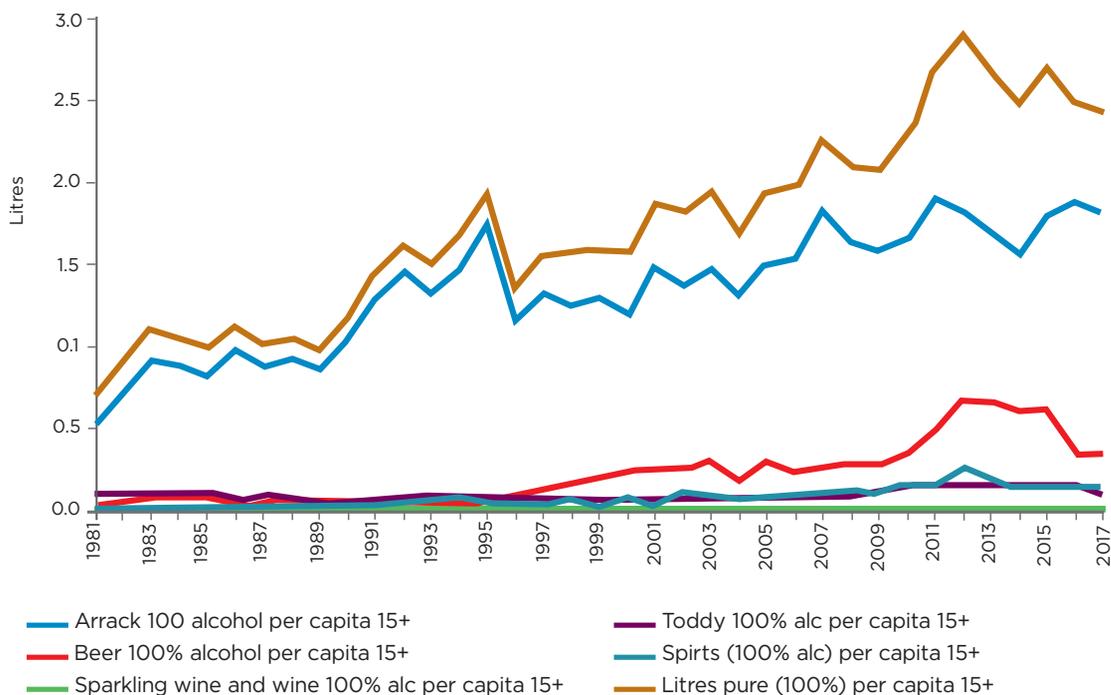


Figure 2. Recorded per capita (15+) alcohol consumption in Sri Lanka 1981-2017. In litres of pure (100%) alcohol for each alcoholic beverage and total (sum of all beverages). Source: Annual reports from Excise department (see also appendix).

Since two of the northern districts lack data for several years and the three remaining northern districts also may have some incomplete data during the war period, the consumption trends are also presented for 23 districts (excluding Mullativu and Kilinochchi) and for 20 districts (excluding the whole Northern Province). As shown in figure 3, the trends are very similar for all three groups of districts. Thus the overall picture in figure 1 remains intact.

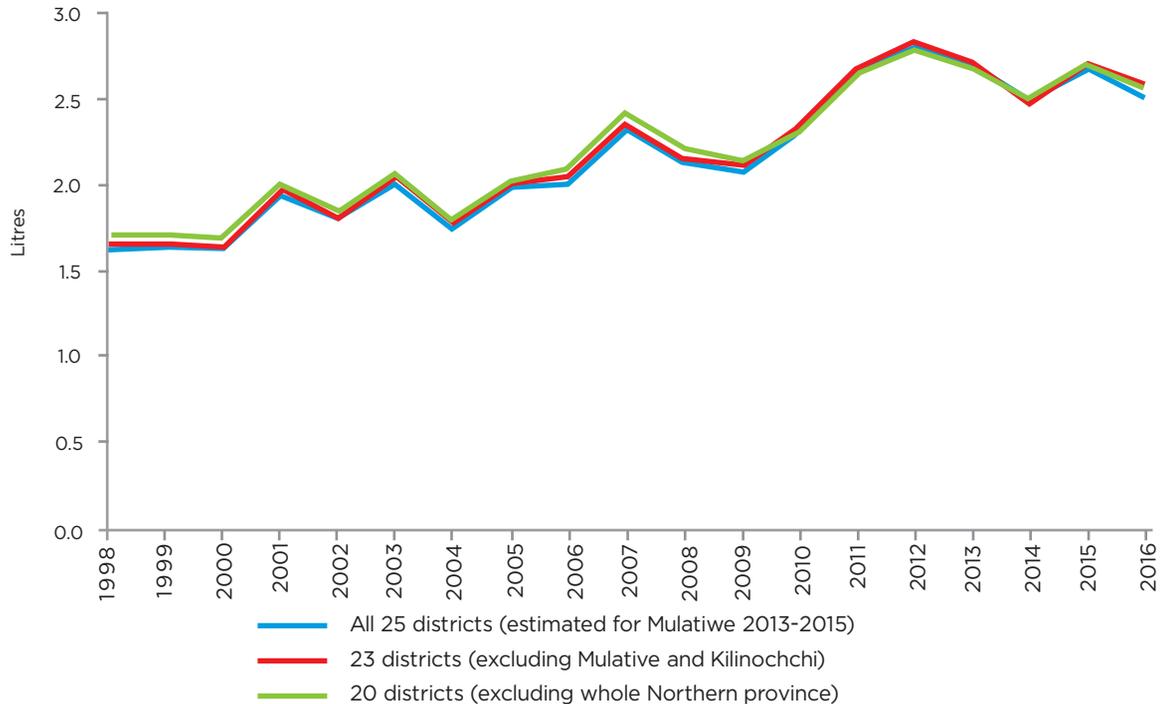


Figure 3. Recorded per capita (15+) alcohol consumption in Sri Lanka 1998-2016. In litres of pure (100%) alcohol (sum of all beverages). All island (all 25 districts), in 23 districts (excluding Mullativu and Kilinochchi in the Northern Province) and in 20 districts (excluding all districts in the Northern Province). Source: Annual reports from Excise department.

ALCOHOLIC BEVERAGE PREFERENCES

As shown in figure 4, arrack is the predominant beverage. During the period 2010-2017, it accounted for about 70% of the total consumption. However, the long-term trend is towards a lower share of total consumption. In the early 1990's arrack accounted for 90% of total consumption (see figure 4). The decline in the share of arrack is followed by an increase in the proportion of beer. In the early 1990s beer stood for about 4% of total consumption, in 2014 the corresponding figure was 25%. After 2014, beer consumption has decreased whereas other beverages have remained on more or less the same level. As a result, beer accounted for 22% in 2015 and 14% in 2017 of total consumption.

Also toddy shows a declining trend in proportion of total consumption. This decline occurred in the late 1980s, from nearly 10% during the first half of the 1980's to about 4-5% in the first half of the 1990s. Since then, this proportion has remained rather stable. It should be noted that a lowered proportion is not synonymous with a decreased per capita consumption. Actually, toddy consumption has increased somewhat during the period. Since the consumption of the two most commonly used beverages – arrack and beer – has increased more than toddy, the proportion of toddy has decreased. Spirits consumption other than arrack (e.g. vodka, gin, rum) also shows an increase in proportion from 2-3% in early 1990's to 7% in 2017.

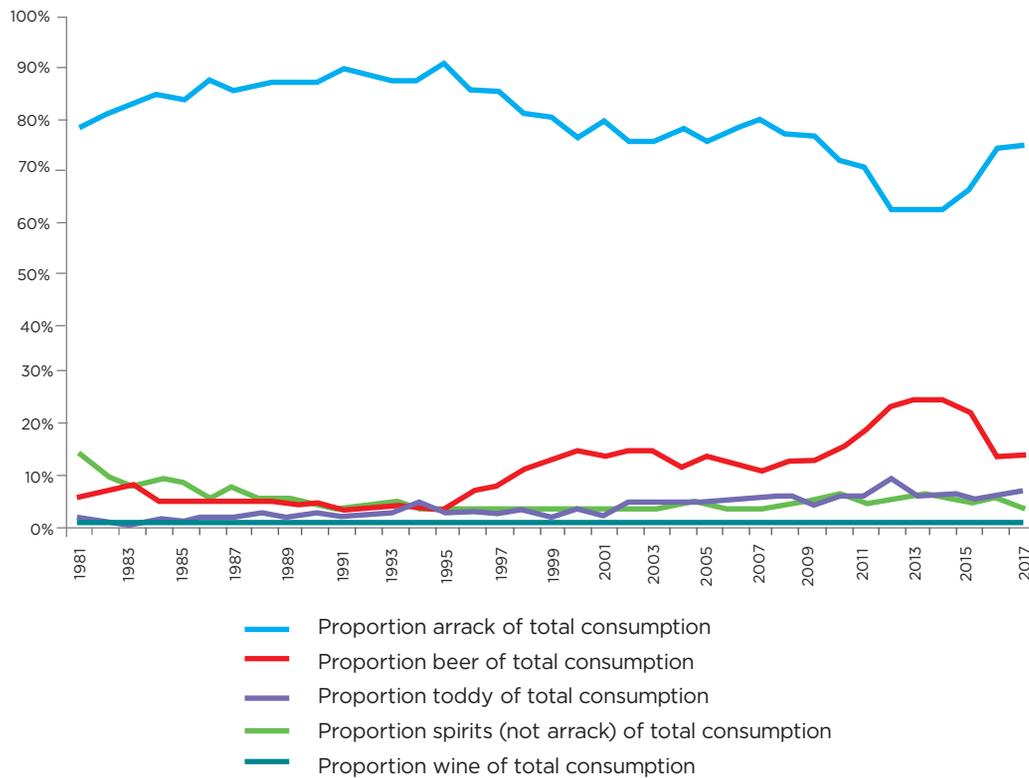


Figure 4. Beverage preferences expressed as proportion consumption of the most common beverages in relation to total recorded consumption. All calculations based on litres of pure alcohol per capita 15+ and then each beverage divided by the total. Source: Annual reports from Excise department, consumption tables in annex.

UNRECORDED AND TOTAL ALCOHOL CONSUMPTION

Unrecorded alcohol consumption in Sri Lanka consists mainly of kasippu. However, there seems to be no consensus regarding the size of the kasippu consumption. Some argue that the consumption level is rather low (e.g. 0.3 or 0.5 litres), others that it stands for a substantial part of all alcohol consumed. Furthermore, the magnitude of kasippu consumption is also referred to in political contexts either to support, or to reject, e.g., proposals of decreasing alcohol taxation.

Data on kasippu consumption is limited, but we will study the data that is available to see if these data can be used to get an assessment of kasippu consumption especially in comparison with other beverages such as arrack.

The most accessible data comes from WHO's estimates of every country's unrecorded consumption. These data are presented in the Global status report on alcohol and health 2014 (WHO, 2014) but also, and more updated, in the Global Information System on Alcohol and Health with data for Sri Lanka in 2005, 2010 and 2015 (but presumably, as indicated by the Global status report, referring the periods 2003-2005, 2008-2010, 2013-2015).

In the WHO Global Information System, the proportion of unrecorded consumption is estimated on country-level. The estimation follows a specific method using rather complex regression analyses with country-specific data from four sources (at least for the 2015 estimates but probably also for the 2010 estimates) (see WHO, 2018):

1. Expert judgements from a WHO survey of experts based on whether any changes in unrecorded consumption had occurred since 2010, the magnitude of these changes, and documented supporting evidence;
2. WHO and CAMH nominal expert group Delphi survey assessing the proportion of unrecorded alcohol consumption in 34 WHO Member States where unrecorded consumption is relatively large (Rehm, et al., 2016);
3. A second WHO and CAMH nominal expert group Delphi survey of 129 experts from 42 WHO Member States; and
4. The STEPwise approach to surveillance (STEPS) surveys (WHO, 2017).

However, it is still unclear how the Sri Lankan estimates of unrecorded consumption (kasippu) were reported and on what grounds. Table 2 shows the unrecorded consumption according to WHO, the recorded consumption (presented above) and the total consumption (the sum of recorded and unrecorded) for 2005, 2010 and 2015.

As seen, both the recorded and the unrecorded consumption increased from 2005 to 2015 and thus also the total consumption. From 2010 to 2015, the unrecorded consumption remained on the same rather high level (1.5 litres) whereas the recorded consumption increased by 0.4 litres. For the latter period the increased total consumption was solely due to the recorded consumption. The table also shows that not only the recorded consumption but also the total consumption increased during this period from 2005 to 2015.

Table 2. Estimations of unrecorded alcohol consumption (according to the WHO), recorded alcohol consumption and total alcohol consumption 2005, 2010, 2015. In litres of pure (100%) per capita (15+).

	2005	2010	2015	Increase 2005-2015		Increase 2010-2015	
				Litres	%	Litres	%
Recorded consumption	1.9	2.3	2.7	+ 0.8	+ 42	+ 0.4	+17
Unrecorded consumption	0.4	1.5	1.5	+ 1.1	+ 175	0.0	0
Total consumption	2.3	3.8	4.2	+ 1.9	+ 83	+ 0.4	+ 11

Sources: Unrecorded: WHO database GISAH;

Recorded: Sales data from Excise department and compiled and converted into litres of pure alcohol p.c.15+

It has been put forward that the consumption of kasippu has declined during recent years (but with no exact definition of period). However, no data has been presented confirming this decline. Still, the WHO figure of 1.5 litres of unrecorded consumption which amounts to 36% of total consumption in 2010 and 2015 must be considered as relatively high compared to other countries. On average for all countries with 2015 data, the corresponding figures were 1.4 litres and 20% (of total consumption) (according to the WHO's GISAH database).

The main question remains however, whether the 1.5 litres unrecorded consumption is correct. There are other data available that might shed some light on this. The National Alcohol Prevalence Survey conducted in 2012 (Somatunga, et al., 2014) reported lifetime prevalence rates of different beverages (table 3). Beer shows the highest prevalence followed by spirits and kasippu. Spirits, which is predominately arrack, shows among men a 2.3 times higher prevalence than kasippu. The corresponding rate for women, with much lower prevalence rates in general, is 7.2. This result does not correspond well with the recorded consumption statistics which shows a much higher consumption level (in pure alcohol) of arrack than beer (3.7 times higher on average 2014-2017). In addition, lifetime prevalence rates are difficult to interpret

since the drinking episodes could have occurred years back in time or rather recent. Thus, these lifetime prevalence rates do not give any reliable indication of how common kasippu is in relation to spirits/arrack.

Table 3. Alcoholic beverages ever consumed (lifetime prevalence) among lifetime drinkers (69.6% of all men, 26.5% of all women) according to the 2012 National Alcohol Prevalence Study.

	Beer	Spirits (mainly arrack)	Wine	Kasippu	Palmyrah toddy	Toddy	Others
Men	76.8%	51.5%	25.8%	22.2%	16.9%	16.8%	5.3%
Women	61.9%	28.1%	25.2%	3.9%	2.6%	4.7%	0.3%

Source: Somatunga, et al., 2014

ADIC (Alcohol and Drug Information Centre) have for more than 20 years conducted Spot-surveys annually, or biannually (e.g. ADIC, 2016). The data collection and sample takes place at certain spots, like bus stations, in different metropolitan areas (cities) in some of the districts in the country. The sample is thus not representative of the population in Sri Lanka since all districts are not covered and since it is only collected at one spot in each district. The degree of standardisation over the years is also somewhat questionable.

Still, the questionnaire includes specific questions on drinking of arrack, beer and kasippu during the past 30 days and, as from 2013 (at least) also questions on the drinking frequency for these beverages with the frequency alternatives daily, a few times a month and occasionally. This makes the Spot-survey interesting for this particular topic of kasippu, in spite of its shortcomings. Therefore, we have retrieved and analysed some of these data covering some of the years from 2005 to 2017.

Table 4 shows the past 30 days' prevalence of the three beverages, also with all respondents as the denominator for these particular years. Of interest here is to compare the prevalence of kasippu with arrack, which is probably the beverage most similar to kasippu. The ratio of the prevalence figures for these two beverages is also shown in the table (in two-years' average figures).

For 2008 and 2010, the average kasippu-arrack frequency ratio was 0.15, during the next period 0.09 and for 2015-2016 roughly 0.04. For the last period it went up again to 0.09, due to an increase in the kasippu prevalence in 2017. For all these years, the ratios are considerably smaller compared to the ratios shown in table 3 based on lifetime prevalence rates. One reason for this is the difference between lifetime and regular (past 30 days) consumption. The latter must be considered to be a better indicator on recent and current drinking habits.

Table 4. Prevalence of use of kasippu, arrack and beer during the past 30 days and the ratio kasippu/arrack according to the ADIC's Spot-surveys for some years from 2005-2017.

	2005	2008	2010	2013	2015	2016	2017
Kasippu							
Past 30 days, users only	8.8%	8.0%	3.8%	5.0%	2.8%	2.8%	10.4%
All respondents ¹	5.4%	3.7%	1.6%	2.0%	1.0%	0.9%	2.6%
Arrack							
Past 30 days, users only	51.1%	68.3%	63.8%	68.8%	61.1%	73.8% ^s	67.5%
All respondents ¹	31.1%	31.4%	26.4%	31.2%	22.4%	24.1%	17.1%
Beer							
Past 30 days, users only	52.5%	44.9%	55.9%	64.4%	58.5%	51.9%	49.7%
All respondents ¹	31.9%	20.7%	23.2%	31.4%	22.8%	16.9%	12.6%
		2005 and 2008	2008 and 2010	2010 and 2013	2013 and 2015	2015 and 2016	2016 and 2017
Ratio kasippu/arrack (all resp.) (two years estimates)		0.15	0.09	0.06	0.05	0.04	0.09

¹The beverage-specific questions were asked only to the past 30 days' users. Here we assume that others drink none of these beverages (coded 0).

Sources: Calculated values by the author using raw data from ADIC SPOT Surveys 2005-2017

The beverage-specific questions were asked only to the past 30 days' users. Here we assume that others drink none of these beverages (coded 0). Source: Spot-survey raw data from ADIC.

From the Spot-surveys in 2013 and onwards, the frequency of drinking each of these beverages can be calculated based on the answer alternatives: daily, few times a month and occasionally. How these alternatives should be coded is not given but here it is done in two ways. One is to give them the following values: 3 (daily), 2 (few times a month) and 1 (occasionally). The other alternative is to take the frequency alternatives more literally: daily (5*365 a year), few times a month (4*12 times a year) and occasionally (12 times a year). The ratio kasippu-arrack estimates based on these two ways of coding is shown in table 5. The ratios vary between 0.04 to 0.10, depending on the coding alternative applied and the years of the survey.

Also shown in table 5, the ratio kasippu –arrack for the two most recent years (2016-2017) indicate a ratio within the interval 0.05-0.10 (5-10%). This might indicate a real increase compared to the immediate previous years. However, the increase is actually only shown in the data for year 2017, not 2016. According to table 4, the simple ratios based on only past 30 days' use (yes/no), may indicate that the ratios were higher in 2005-2008 than 2016-2017. In other words, the frequency of kasippu consumption could be somewhat higher about 10 years ago compared to 2013-2016 but may have increased in 2016/2017.

Table 5. Drinking frequencies during past 30 days for arrack, beer and kasippu and the ratio kasippu/arrack according the ADIC's Spot-surveys for the years 2013, 2015, 2016 and 2017.

	2013	2015	2016	2017
Alternative 1 (coding: 3,2 1)				
Frequency per 100 respondents				
Kasippu frequency	3.8	1.7	2.1	4.9
Arrack	44.1	38.2	44.9	30.5
		2013-15	2015-16	2016-17
Ratio kasippu/arrack (two years estimates)		0.065	0.045	0.104
Alternative 1 (coding: 5*365, 12*4, 12)				
Frequency per 100 respondents				
Kasippu	13.7	3.9	7.3	19.9
Arrack	237.7	297.3	301.0	214.9
		2013-15	2015-16	2016-17
Ratio kasippu/arrack (two years estimates)		0.035	0.019	0.058

Source: Spot-survey raw data from ADIC.

Overall, all these ratios from the Spot-survey data in tables 4-5 indicate a rather small portion of kasippu consumption compared to arrack consumption. The weaknesses with the Spot-survey (mentioned above), however, calls for great caution to draw too big conclusions from these data.

However, given this cautiousness, a 5-10% kasippu drinking frequency in relation to arrack could also be the ratio in terms of consumption volumes. Consequently, these ratios will be applied to the recorded arrack consumption. In 2016-2017, arrack consumption was 1.84 litres per capita (15+) (see figure 2). Hence, if kasippu accounts for 5-10% of this arrack volume, the kasippu consumption would be in between 0.09-0.18 litres of pure alcohol per capita (15+). This is significantly lower than the 1.5 litres reported by the WHO in both 2010 and 2015. In summary, even if the Spot-surveys underestimate the kasippu drinking frequencies, it is still difficult to see that the true level of unrecorded consumption could reach 1.5 litres of pure alcohol per capita (15+).

IMPACT OF TOURIST'S CONSUMPTION ON SRI LANKAN'S PER CAPITA RECORDED ALCOHOL CONSUMPTION

Being a popular tourist destination, there is a general belief that the alcohol consumption by the tourists in Sri Lanka will lead to an over-reporting of the actual alcohol consumed by Sri Lankan inhabitants. Therefore, this section estimates the litres of alcohol consumed by tourists and relates the estimates to the total Sri Lankan recorded consumption.

The calculating of alcohol consumed by tourists (15 years of age and older) in Sri Lanka in year 2016 is based on (1) the number of tourists who visited Sri Lanka, (2) the average amount of time they spent in the country (number of nights) that year, and (3) how much these people drink on average in their countries of origin (estimated based on per capita consumption of recorded and unrecorded alcohol for 2015 [2016 data not available]). This procedure is the same as the one used by WHO within the frame of the Global Status Report on Alcohol and Health 2018 (WHO, 2018).

When calculating the tourists' alcohol consumption three scenarios have been used. A minimum, a medium and a maximum estimate have been calculated. The minimum is based on the assumption that tourists in Sri Lanka drink the same amounts of alcohol when they are tourists as they do in their home countries (the per capita consumption in the country of origin (used by the WHO)). In the second alternative, it is assumed that they drink twice the average level, and the third alternative is based on the assumption that the tourists drink three times more in Sri Lanka compared to the average of their country of origin.

The results of these estimations are shown in table 6. In 2016, the total recorded (sales) volumes of alcohol in pure litres in Sri Lanka were roughly 39 million litres. The consumption volumes by tourists were estimated at: 434 000, 868 000 and 1 300 000 litres of pure alcohol respectively, based on the three assumptions. According to the first assumption, based on the average of the country of origin, the tourists' alcohol consumption account for 1.1% of the total recorded consumption in Sri Lanka (434 000/ 39 000 000). The second (twice the average) give a corresponding estimate of 2.2% and the third (three times the average) an estimate of 3.3% of the total recorded consumption in year 2016.

In pure alcohol consumption per capita (15+), the Sri Lankan recorded alcohol consumption in 2016 was 2.50 and after subtracting the tourist consumption it would be reduced to in between 2.47 (min) – 2.41 (max) litres of pure alcohol per capita (15+).

Hence, all estimates indicate a rather low impact of tourist consumption on the recorded consumption in Sri Lanka. Furthermore, given these small changes in consumption after considering the tourists' consumption, it cannot explain the trends in per capita alcohol consumption shown in figure 2 more than marginally (a few centilitres; from -0.03 to -0.08 litres of pure alcohol per capita, 15+), despite the fact that the number of tourists have increased in Sri Lanka during recent years.

Table 6. Estimations of tourists' alcohol consumption in Sri Lanka and its impact on total recorded consumption.

	Number of nights stayed	Number of adults (20+)	Total tourist days stayed	Per capita alcohol consumption	Estimated tourist consumption in Sri Lanka (volume of pure alcohol in litres)		
					As average in country of origin	Twice the average of country of origin	Three times the average of the country of origin
Canada	18	38359	675118	10.3	19051	38103	57154
USA	11	52111	583643	9.0	14391	28782	43174
Austria	19	16177	300892	8.5	7007	14014	21021
Belgium	11	13206	146587	10.8	4337	8675	13012
Denmark	15	14663	214080	10.2	5983	11965	17948
Finland	12	4520	51980	11.9	1695	3389	5084
France	10	84589	837431	11.6	26614	53228	79843
Netherlands	10	38102	377210	9.6	9921	19842	29763
Italy	11	28716	315876	6.1	5279	10558	15837
Norway	13	11413	146086	7.0	2802	5603	8405
Spain	12	17472	200928	10.6	5835	11670	17506
Sweden	12	19103	225415	9.2	5682	11363	17045
Switzerland	15	23652	345319	10.4	9839	19678	29518
UK	14	173198	2476731	12.0	81427	162854	244280
Germany	12	131371	1537041	10.6	44637	89275	133912
Others ¹	8	18482	142311	9.9	3854	7708	11562
Russia	10	53780	516288	14.5	20510	41020	61530
Ukraine	9	29189	259782	11.8	8398	16797	25195
Others	9	66420	571212	10.3	16119	32238	48357
South Africa	10	4853	46589	11.5	1468	2936	4404
Others ¹	10	6325	60720	6.2	1031	2063	3094
Israel	8	9564	78425	3.1	666	1332	1998
Saudi Arabia	8	31611	259210	0.2	142	284	426
Kuwait	8	4941	40516	0.1	11	22	33
Oman	8	10910	89462	0.9	221	441	662
Others ¹	8	33985	278677	0.7	534	1069	1603
China	9	257657	2421976	7.6	50430	100860	151291
Indonesia	3	15716	50291	0.6	83	165	248
Japan	9	41117	370053	7.5	7604	15208	22811
Malaysia	6	23070	147648	1.7	688	1375	2063
Philippines	8	11527	88758	5.6	1362	2724	4085
Singapore	6	17405	107911	2.9	857	1715	2572
Thailand	7	9162	60469	8.3	1375	2750	4125
South Korea	10	13459	139974	10.9	4180	8360	12540
Others ¹	7	13477	99224	5.6	1533	3065	4598
India	8	329677	2736319	5.0	37484	74968	112451
Maldives	11	81359	862405	1.7	4017	8033	12050
Pakistan	8	26264	204859	0.1	56	112	168
Bangladesh	8	14520	120516	0.2	66	132	198
Others ¹	9	30402	266018	1.8	1275	2551	3826
Australia	11	67964	734011	11.2	22523	45046	67569
New Zealand	11	7723	82636	10.1	2287	4573	6860
Others ¹	4	290	1189	6.8	22	44	66

Total tourist alcohol consumption (litres pure alcohol): Total recorded consumption in SL 2016: 2.50 litres p.c. 15+ (39,565,225 litres of pure alcohol)	433,297	866,593	1,299,890
Proportion tourist consumption of total recorded:	1.1%	2.1%	3.3%
Tourist consumption in litres of pure alcohol:	- 0.03	- 0.05	- 0.08
Recorded alcohol consumption net of tourists:	2.47	2.44	2.41

¹ Others = refers to the number of nights etc. for the sum of other countries belonging to the same category of countries as listed above Self-reported consumption measures as indicated by general population surveys

Source: Sri Lankan Tourism Development Authority, 2017

SELF-REPORTED CONSUMPTION MEASURES AS INDICATED BY GENERAL POPULATION SURVEYS

Another data source is drinking of alcohol measured by means of general population surveys on the adult Sri Lankan population. Most of these questions, and results published, relates to the drinking frequency of any alcoholic beverages (irrespective of which kind, including kasippu). This section investigates the results obtained in different general population surveys conducted since 2002 until 2015.

Table 7 summaries the results from five general population surveys conducted since 2002. For the first two studies (2002 and 2005/2006), only the prevalence of past 12 months' consumers is shown, whereas for the other three studies, drinking frequencies and the prevalence of past 30-days drinking is also reported.

Table 7 further indicates that the prevalence of past 12-months drinking among males have remained fairly constant at around 50% (the latest in 2015: 50.1%) while the proportion among women have differed from 1.2% to 7.4% during this period while the latest study, carried out in 2015, showed a past 12 months prevalence of 1.8%.

The differences over the years, particularly among women, could perhaps to a substantial degree be due to methodological differences among the studies. For instances, some of the studies are conducted in all 25 districts, some in most of them, and one in only five randomly chosen districts out of the total of 25 in the country (see notes under table 4).

As for the three latest studies, drinking frequencies are shown as well. The study in 2012 did not include daily drinkers and the 2015 study included a more detailed weekly frequency scale with one alternative being 1-2 times a week and the other 3-4 times a week. The prevalence figures for these two weekly drinking categories were summed into broader category 1-4 times a week used in the two other studies 2012 and 2015. Otherwise, the frequency scales in the three studies are identical.

As can be seen, a shift in the distribution from 'less than once a month' in 2007 to '1-3 times a month' is evident. Among men, 56% reported drinking less than once a month in 2007, in 2002 only 28%. At the same time the proportion of drinkers 1-3 days a month increased from 22% to 47%. The corresponding figures for women were from 95% to 51% (less than once a month) and 3.3% to 40% (1-3 times a month). It should be mentioned though, that these proportions refer only to the drinkers. (Thus, about 93% women and 50% men were not included in 2007 and 2012 in the table since they are abstainers. The corresponding figures for 2015 were 98% women and 50% men).

In 2015, the frequencies appear to have been declined somewhat but they are overall still on a higher level than in 2007. This is also shown in the table where the total drinking frequency per respondent per year is calculated using the categorisation shown in the notes in table 7. The lowest drinking frequency is found in 2007, the highest in 2012. The drinking frequency for men in 2015 is rather close to the one in 2012, but for women even less than 2007. As also shown in table 7, the estimated drinking frequency per respondent equals 30 drinking days in 2015. For women the corresponding number is 0.3, thus lower than in 2007.

Table 7. Drinking frequency among drinkers in the three national alcohol surveys¹

	Men					Women				
	2002	2005/ 2006	2007	2012	2015	2002	2005/ 2006	2007	2012	2015
Daily	9.4	..	5.7	..	..	0.5	..	0
5 times a week or more often (5-6 days per week)	2.8	9.8	1.5	..	..	0.5	7.3	1.5
1-4 times a week	9.9	15.8	23.6	..	..	0.5	1.5	5.4
1-3 days a month	21.7	46.6	25.6	..	..	3.3	40.1	3.3
Less than once a month	56.2	27.8	43.5	..	..	95.2	51.1	89.8
Drinking freq. per respondent (incl. abstainers)	15.6	31.6	30.1	..	..	0.5	2.6	0.3
Mean drinks per drinking occasion per drinking day ²	4.8	4.8	4.8	..	..	3.2	3.2	3.2
Estimated mean number of drinks per year per all respondents (per respondents) ³	75	152	144	..	..	2	8	1
Proportion (%) past 30-days drinkers	26.0%	37.5%	34.8%	..	..	1.2%	2.4%	0.5%
Proportion (%) past 12-months drinkers	53.1%	48.1% ⁴	52.8%	51.5%	50.1%	6.4% ⁴	1.2%	6.2%	7.4%	1.8%

¹ 2002- GENACIS-study in 17 out of 25 districts (Hettinger & Paranagama, 2005); 2005/2006: Sri Lanka Diabetes and Cardiovascular Study in 7 out of 9 Provinces (Katulanda, et al., 2014); 2007: the STEPS-survey (National non communicable disease risk factor study) in 5 randomly selected districts out of 25 districts (Directorate of non- communicable disease. Ministry of healthcare and nutrition, 2008); 2012: The National Alcohol Use prevalence study in all 9 provinces (Somatunga, et al., 2014); 2015: STEPS-survey in all 25 districts (Non Communicable Disease Risk Factor Study Sri Lanka, 2015; Ministry of Health, Nutrition and Indigenous Medicine, WHO, 2015).

² Daily: here categorised as 5.5 times a month in year 2007 and year 2015. This is used since 2012 do not include daily drinking as an alternative. Thus, all daily drinkers 2007 and 2015, and those drinking 5 times a week or more often in 2007, 2012 and 2015, are categories as 5.5 times drinkers a week. 1-4 times a week: categorised as 2.5 times a week; 1-3 days a month: categorised as 2 times a month; less than once a month: categorised as 6 times a year. 2015: 1-2 and 3-4 times a week were collapsed into 1-4 time a week.

³ Since number of mean drinks per day is not presented for the 2012 and 2015, the 2017 numbers are used also for 2012 and 2015. Thus, the quantity per drinking day is held constant;

⁴ Refers to drinking during the past 6 months; .

.. Not applicable or no data available.

Assuming the same mean number of drinks per drinking days (more or less synonymous with drinking occasion) 2012 and 2015 as in 2007 (4.8 for men drinkers and 3.2 for women drinkers), it is possible to estimate (very roughly) the total number of drinks per year. Multiplying the mean number of drinks (4.8 vs. 3.2) with the number of drinking days (just mentioned), the mean (per capita) number of drinks per year is estimated at 75 for men and 1 for women in 2015. (Since the number of drinks per drinking day is held constant, the trends are identical with the trends in drinking frequency 2007, 2012 and 2015). Overall, the results shown in table 7 suggest an increase in alcohol consumption in the Sri Lankan population from 2007 to 2012 and thereafter a decrease. Overall, the 2015 estimates (men and women together) are closer to the 2012 level than the 2007 level. Hence, the self-reported alcohol consumption trends, estimated by means of these three prevalence studies, are in line with the trends in the per capita recorded alcohol consumption shown in figure 2.

PER CAPITA CONSUMPTION AMONG ALL AND AMONG DRINKERS ONLY

The survey data analysed in this section is based on the STEPS-survey 2015 (NCD Risk Factor Study) with 50% male drinkers and 1.8% female drinkers (past 12 month users) (Ministry of Health, Nutrition and Indigenous Medicine, 2015) and an estimated 144 times higher per capita consumption among men than among women. This gender ratio is based on an estimated alcohol consumption of men and women using the frequencies and number of drinks per drinking day (quantity*frequency) as mentioned in table 7.

Three different alternative estimates of unrecorded alcohol consumption will be used. The first one assumes an unrecorded consumption of 0.3 litres of pure alcohol (per capita 15+), the second an unrecorded of 0.5 litres and the third and unrecorded level of 1.5 litres (which is the figure published by the WHO, 2014; and in the WHO GISAH database for 2010 and 2015. The recorded consumption relates to year 2016.

As shown in table 8, almost all the consumption ends up with the men (5.6, 6.0 litres or 7.9 litres). The women's share is, thus very small (0.04-0.06 litres). Since 50% men are drinkers, the consumption among male drinkers doubles compared to the per capita male consumption: from 5.6-7.9 litres to 11.9-15.9 litres, depending on the estimated total per capita (15+) alcohol consumption (2.8, 3.0 or 4.0 litres). The consumption among female drinkers amounts to 2.1-2.8 litres. It should be emphasised that the proportion of drinkers among women is very low (1.8% in 2015).

Not in any of these three alternative estimates, male drinkers consume more than 16 litres on average, thus far from the reported 26.7 litres in the WHO's Global Status Report on alcohol and health (WHO, 2014). Most likely, the proportion of drinkers used in the WHO-estimates have incorrectly been based on the prevalence of past 30 days' drinkers when it should have been based on the prevalence of past 12-months drinkers.

After the analyses in this report were completed, the 2018 WHO-global status report (WHO, 2018) was published with substantially lower, but more correct, consumption level for male drinkers (18.9 litres) but higher, and incorrect, level for female drinkers (6.7 litres). These figures were based on a prevalence of 40.6% 12-months drinkers for men and 17.9% among women. The 40.6% is still lower than the one reported in the 2015-STEP-survey (men: 50.1%) but the 17.9% for women are much higher than the one reported in in the 2015-STEP-survey (women: 1.8%).

Table 8. Estimated per capita consumption among all and per capita consumption among drinkers only.

Three alternative assumptions on the amount of unrecorded (kasippu) consumption		Per capita (all)	Per consumer
Alternative 1: total. 2.8 (recorded: 2.5; unrecorded: 0.3)	All	2.8	10.8
	Men	5.6	11.1
	Women	0.04	2.2
Alternative 2: total. 3.0 (recorded: 2.5; unrecorded: 0.5)	All	3.0	11.6
	Men	6.0	11.9
	Women	0.04	2.3
Alternative 3: total 4.0 (recorded: 2.5; unrecorded: 1.5)	All	4.0	15.4
	Men	7.9	15.9
	Women	0.06	3.1

Source: WHO-data on unrecorded alcohol consumption (GISAH-database), STEP-survey data on proportion 12-months drinkers (Non-Communicable Disease Risk Factor Study Sri Lanka, 2015), Excise Department on recorded consumption data (Annual reports over the years, see e.g. Excise Department, 2016).

REGIONAL TRENDS IN RECORDED ALCOHOL CONSUMPTION – DISTRICTS AND PROVINCES

In this section the consumption trends on the district and provincial level will be studied. One aim is to outline the general trends in beverage preferences and especially in aggregate alcohol consumption across regions. The emphasis is on the dispersion over time among the districts. This will give an overview of all the districts but will not highlight individual districts. Another aim is therefore to look more closely behind these trends and to analyse the development for different groups of districts, in this case the nine provinces. The study period is from 1998 to 2016.

In table 9, the consumption trends for all districts, except Kilinochchi and Mulative, are shown for five sub-periods from 1998-2016. The districts are sorted from the highest to the lowest in consumption during the latest period (2013-2016).

For all periods except period 2, Nuwara Eliya shows the highest per capita consumption; in period 5 followed by Vavunia and Mannar. Also Colombo shows a relatively high consumption, and the highest in period 2. Ampara, Puttalam and Batticaloa show consistently low consumption levels.

All districts show an increase in alcohol consumption during the study period, and in all but four, an increase from period 4 to period 5 as well. Jaffna shows the biggest relative increase from period 1 to period 5 (+ 308%) whereas Mannar shows the biggest increase in litres (+ 2.05 litres) followed by Jaffna (+ 1.97 litres). Some of the districts with highest consumption level throughout the study period show a rather modest increase both in litres and in percent, e.g. Nuwara Eliya, Colombo and Kandy.

Table 10 shows the more current drinking trends from 2013 to 2016 for the 23 districts sorted by the districts with highest increase in litres from 2013-2016. The majority of districts show a decrease in consumption 2013-2016. However, seven districts show an increase. By far the sharpest increase is found in Kegalle (+ 1.39 litres). Also Ampara and Badulla show rather large increases in litres (and in percent).

As mentioned, the consumption trends for the whole country, shown in figure 2, are seen in all districts (table 9). Consequently, the increase after the war – 2009-2012 – is a phenomenon all over the country and not isolated to the districts in the Northern Province, being the region most affected by the war. The underlying causes of the trends in alcohol consumption appears to be, at least to some extent, applicable for the whole country. Since it is highly likely that the magnitude of kasippu drinking differ significantly between the districts, the increase in recorded alcohol consumption across all districts may also suggest (indirectly) that the recorded consumption statistics is a valid indicator of the true consumption trends.

Table 9. Recorded alcohol consumption per capita (15+) per district in five periods 1998-2016. In litres of pure (100%) alcohol per year (annual mean for each period) (Kilinochchi and Mutative districts not included due to missing data for most of the years.) Sorted from highest to lowest per capita consumption in period 5.

Districts	Period 1	Period 2	Period 3	Period 4	Period 5	Change			
	1998-2000	2001-2004	2005-2008	2009-2012	2013-2016	Period 1-5		Period 4-5	
						%	Litres	%	Litres
Nuwara Eliya	4.23	3.97	4.49	4.73	4.70	11%	0.48	-1%	-0.02
Vavunia	1.61	2.03	2.16	3.92	3.40	112%	1.79	-13%	-0.52
Mannar	1.32	1.15	1.38	2.91	3.37	154%	2.05	16%	0.46
Colombo	2.78	4.42	3.02	3.00	3.31	19%	0.54	11%	0.32
Matale	1.30	1.39	2.73	2.93	3.14	142%	1.84	7%	0.21
Kandy	2.19	3.39	2.59	2.97	2.98	36%	0.78	0%	0.01
Hambantota	1.08	1.17	1.79	2.69	2.85	163%	1.76	6%	0.16
Matara	1.30	2.04	2.42	2.62	2.78	115%	1.49	6%	0.16
Jaffna	0.64	1.23	0.81	2.61	2.61	308%	1.97	0%	0.01
Galle	1.34	1.26	1.83	2.23	2.59	93%	1.25	16%	0.36
Gampaha	1.76	1.48	2.20	2.56	2.56	46%	0.81	0%	0.00
Badulla	1.16	1.40	1.77	2.17	2.51	117%	1.35	16%	0.34
Ratnapura	1.27	1.46	1.88	2.38	2.51	97%	1.23	5%	0.13
Polonnaruwa	0.93	1.11	2.01	2.39	2.49	167%	1.56	4%	0.10
Anuradhapura	0.81	1.24	1.54	2.42	2.46	205%	1.66	2%	0.04
Monaragala	1.09	1.04	1.53	2.10	2.34	114%	1.25	12%	0.25
Kaluthara	1.35	1.35	1.84	2.36	2.25	67%	0.90	-4%	-0.11
Kegalle	1.16	1.33	1.89	1.96	2.13	83%	0.97	9%	0.17
Trincomalee	1.03	1.24	1.71	1.94	1.94	89%	0.91	0%	0.00
Kurunegala	2.47	0.93	1.77	1.89	1.93	-22%	-0.54	2%	0.04
Baticola	1.04	0.45	0.85	1.39	1.92	84%	0.88	38%	0.53
Puttalam	0.84	0.94	2.18	1.94	1.88	123%	1.04	-3%	-0.06
Ampara	0.78	0.76	1.25	1.18	1.61	107%	0.83	37%	0.43

Furthermore, the upward consumption trends in all districts indicates a regional homogeneity in drinking and, since the consumption increase appear to be weaker in some of the high drinking districts (shown in tables 9-10), a tendency towards reduced differences among the districts over time, i.e. a convergence trend.

We will take a closer look at these two phenomena – homogeneity and convergence by, first, presenting two dispersion measures (standard deviation [SD] and coefficient of variation [CV] between the districts over the years (in two-year periods) and, second, by studying the consumption trends in the nine provinces.

Table 10. Recorded alcohol consumption per capita (15+), per district 2013-2016. In litres of pure (100%) alcohol per year (Kilinochchi and Mullativu districts not included due to missing data for most of the years.) Sorted from highest to lowest increase in litres 2013-2016.

Districts	2013	2014	2015	2016	Change 2013 -2016	
					%	Litres
Kegalle	1.80	1.77	1.76	3.18	77%	1.39
Ampara	0.98	1.27	2.59	1.57	60%	0.59
Badulla	2.15	2.47	2.70	2.73	27%	0.57
Baticola	1.74	1.79	2.17	1.97	13%	0.23
Trincomalee	1.92	1.83	2.03	1.99	4%	0.07
Hambantota	2.78	2.75	3.02	2.82	1%	0.04
Matara	2.71	2.73	2.96	2.72	1%	0.02
Mullativu ¹	2.21	2.07	2.20	..	-1%	-0.01
Matale	3.14	3.02	3.27	3.12	-1%	-0.02
Monaragala	2.33	2.20	2.54	2.30	-1%	-0.03
Kandy	3.06	2.93	2.93	2.98	-3%	-0.08
Kaluthara	2.24	2.33	2.36	2.07	-8%	-0.17
Anuradhapura	2.51	2.44	2.56	2.33	-7%	-0.18
Puttalam	1.92	1.95	1.91	1.74	-10%	-0.19
Kurunegala	2.00	1.91	2.03	1.78	-11%	-0.22
Gampaha	2.66	2.58	2.60	2.42	-9%	-0.25
Jaffna	3.26	1.94	2.24	3.01	-8%	-0.25
Ratnapura	2.55	2.56	2.64	2.28	-10%	-0.26
Kilinochchi	3.31	3.01	2.48	3.04	-8%	-0.27
Nuwara Eliya	4.92	4.57	4.76	4.57	-7%	-0.35
Galle	2.76	2.48	2.74	2.37	-14%	-0.38
Mannar	3.57	3.28	3.64	3.00	-16%	-0.57
Colombo	3.89	2.80	3.31	3.26	-16%	-0.62
Vavunia	3.55	3.49	3.78	2.80	-21%	-0.75
Polonnaruwa	3.06	2.20	2.44	2.27	-26%	-0.79

¹ Change from 2013 to 2015.

The two dispersion measures calculated over time is depicted in figure 5 together with the recorded per capita alcohol consumption. The CV decreases steadily over the study period, the SD from 2001-2002 to 2007-2008 and also from 2013-2014 to 2015-2016. Although not a steady decline during the whole study period, taken together both measures clearly show that the difference in alcohol consumption between the districts has gradually diminished over time, i.e. a convergence trend is clearly visible.

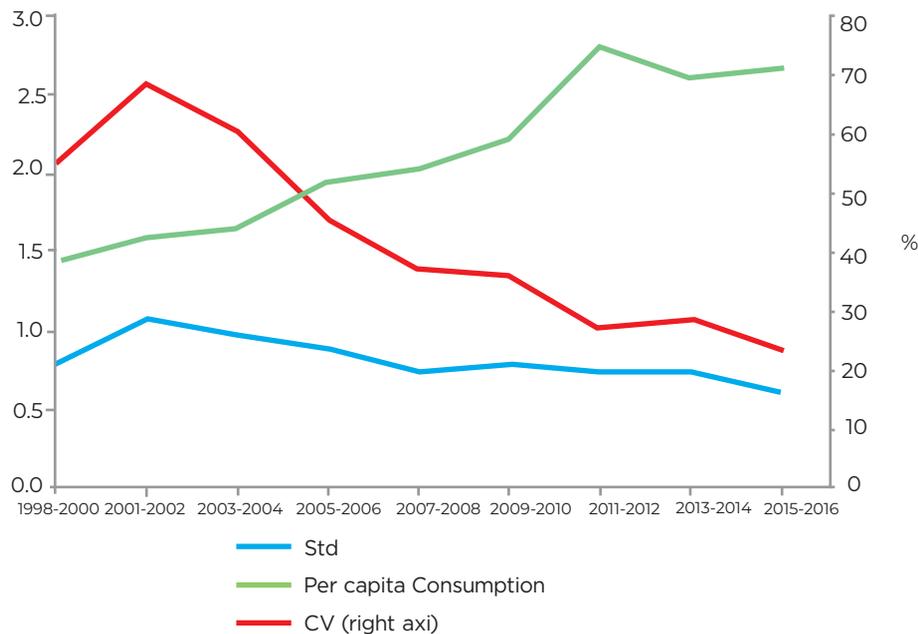


Figure 5. Recorded alcohol consumption per capita (15+) (left axis), coefficient of variation and standard deviation (right axis) for each two-year period 1998-2016 (first period three-year period: 1998-2000).

This converging trend is also evident in figure 6, but here among the nine provinces over five time periods from 1998 to 2016. All nine provinces show an increase in alcohol consumption over the whole study period. The differences between the provinces are lower in the end than in the beginning of the study period. It is also clearly visible that the increases are larger in provinces with rather low consumption level at the start of the study period. The Central and Western provinces with high consumption levels show among the lowest increases.

Figure 6 also shows that for six provinces, the consumption has declined or been on a rather stable level for the two last periods. The Eastern, Uva and Southern provinces show a continued increase even in the last time period.

The Southern and the Uva provinces show the biggest relative increase during the whole study period while the Central Province shows the highest consumption level (in per capita, 15+) during all five periods. The Northern Province reported a large increase from period 3 (2005-2009) to period 4 (2009-2012), thus before and after the end of the war. It should be noted though that Kilinochchi and Mullativu districts are not included in the Northern Province due to missing data for most of the years.

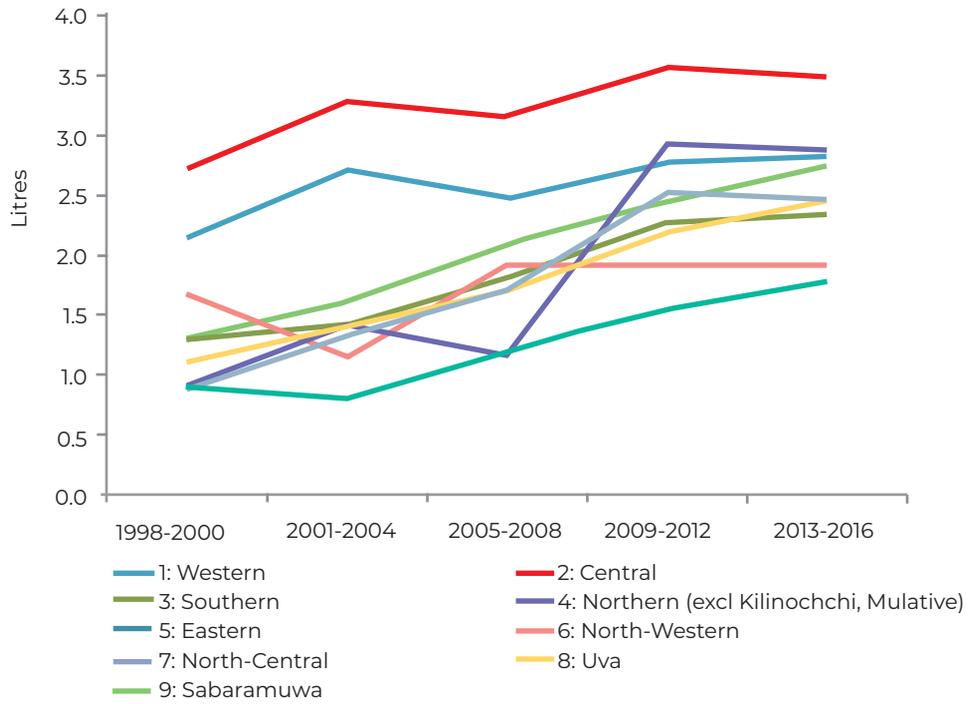


Figure 6. Recorded alcohol consumption per capita (15+), per province in Sri Lanka in five periods 1998-2016. In litres of pure (100%) alcohol per year (annual mean for each period). (Northern Province excluding Kilinochchi and Mullative).

DISCUSSION AND SUMMARY

It has previously been shown that the recorded alcohol consumption increased in Sri Lanka from 1998 to 2013 for the 18 districts not directly exposed to the war and that the rate of increase was sharper after the war, in the 2009-2013 period (Nugawela, et al., 2017) (also shown in figure 2). This increased rate of consumption after the end of the war was almost entirely due to an increase in beer consumption from 2009 to 2012 (see also Nugawela, et al., 2017)

This study has shown that the recorded alcohol consumption actually peaked in 2012 and has thereafter decreased almost year by year. In 2017, the consumption was 2.4 litres of pure alcohol per capita (15+) which is a 16% decline compared to 2012. Beer explains a large part of the increase from 2009-2012, and the entire decrease thereafter as well. Interestingly, almost the entire drop in beer consumption occurred in one year, i.e. from 2015 to 2016. In 2015, the level reached 0.60 litres and in 2016 0.34 litres (in 100% alcohol per capita (15+)). In 2017, the beer consumption remained on the same level as in 2016.

Seen from a longitudinal perspective, however, the consumption has increased rather steadily from about 1.0 litre in the 1980s, 1.5 litres in the 1990s, 2.0 litres in 2006 to 2.9 litres in 2012. The decline of 2012-2017 is the only declining trend during the study period which has lasted for more than two years.

This study has also shown that the increase over the study period occurred in all provinces and in all districts. It could be described as a kind of collective shift in drinking across all districts, upward until 2012 and then stable or a drift downward after 2012 in most but not all districts.

Data on drinking frequencies obtained from general population surveys conducted before and after the end of the war support our finding of a sharp increase in alcohol consumption after the end of the armed conflict until 2012 followed by a decline (survey data 2015 compared to 2012). Kasippu consumption and the tourists' consumption in Sri Lanka do not change this picture, although the total consumption is higher than the recorded consumption.

Another important finding is that the differences in consumption levels among districts and provinces diminish during the study period mainly as a result of initially low-consumption districts approaching the levels of the districts with overall higher, but steadier, consumption levels. In others words, the regional consumption levels show a clear convergence trend.

According to the WHO database GISAH, the total alcohol consumption in Sri Lanka is roughly 4 litres or pure alcohol per capita (15+) both in 2010 and in 2015. The 2010 figures are also mentioned in the WHO's Global status report on alcohol and health 2014 and 2018 (WHO, 2014, 2018).

Based on 4 litres (2.5 litres recorded and 1.5 litres unrecorded), the total consumption for men and women and per male and female drinker are estimated based on the proportion alcohol consumed by men and women (144 times higher among men) respectively and the proportion of male and female drinkers. According to the WHO (GISAH), the per capita consumption for men and for women in Sri Lanka is 7.0 litres and 1.1 litres respectively in 2010 and 7.7 and 1.2 litres in 2016.

The next step in the WHO-calculation of the per drinker consumption, however, departs from incorrect proportions of past 12-months drinkers: 27.9% male and 9.9% female drinkers in 2010 and 40.6% male and 17.9% female drinkers in 2016. The true past 12-months prevalence of drinkers (current drinkers according to the WHO definition) according to the in 2015 is about 50% for men (and has been so, for, at least, the past 15 years) and about 2% for women (see table 7). Any other recent prevalence figures have, what I know about, not been published.

This study has shown that if these correct proportions are applied, the per drinker consumption among men is at the most 16 litres of pure alcohol, probably even less since 1.5 litres unrecorded, and therefore 4 litres total consumption, may be too high. Among the less than 2% women drinkers, the consumption amounts to roughly 2.8 litres of pure alcohol.

Men consume almost all alcohol in Sri Lanka. The base value of 4 litres per capita is thus, more or less, multiplied twice by the factor of two; first to estimate the per capita male consumption ($4 \times 2 = 8$) and then to estimate the male drinkers' per capita consumption ($8 \times 2 = 16$). This double multiplication is higher than in many other countries, but not unique, and since the base level is rather low (4 litres of pure alcohol per capita 15+ at the most), the per drinker consumption among men in Sri Lanka is not higher than in many other countries, e.g. European countries (see the WHO's GISAH database). This picture of the drinking patterns in Sri Lanka has not previously been communicated. However, as was indicated by the analyses of the Spot-surveys above, the WHO-estimate at 1.5 litres unrecorded consumption, and therefore 4 litres total consumption, may be too high. If the unrecorded consumption amounts to 0.5 litres instead of 1.5 litres, the per drinker consumption would be 11.9 litres among men and 2.3 litres among women. These estimates of per drinker consumption are significantly lower than for most countries in Europe.

It is important to stress, that the size of the unrecorded consumption in Sri Lanka is unclear and, subsequently, a better assessment of the size of unrecorded alcohol consumption is needed. One such promising attempt is the forthcoming WHO STEP-survey which includes questions of unrecorded consumption and beverage specific total consumption. This will make it possible to estimate the size of unrecorded kasippu consumption in relation to the total consumption.

Since this study has a descriptive approach it is beyond the scope of the study to explore different causal explanations to the findings presented. This will, however, be done in forthcoming studies, among other things by time series analyses of the relationship between alcohol prices and alcohol sales.

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APPENDIX

Sales data 1981-2007 for each alcoholic beverage (in litres and in 100% alcohol per capita 15+) and total sales (sum of each beverage, in 100% alcohol per capita 15+)

Year	Arrack (L)	Arrack 100 alcohol per capita 15+	Beer (L)	Beer 100% alcohol per capita 15+	Sparkling wine and wine (L)	Sparkling wine and wine 100 % alc per capita 15+	Toddy (L)	Toddy 100% alc per capita 15+	Spirits (L)	Spirits (100% alc), per capita 15+	Litres pure (100%) per capita 15+
1981	14955698	0.521	5722900	0.039		0.002		0.091		0.011	0.663
1982	21113251	0.714	9673098	0.064		0.002		0.091		0.011	0.881
1983	27270804	0.902	13623295	0.088		0.002		0.091		0.011	1.094
1984	27486651	0.893	8051704	0.051	118383	0.001	14013947	0.095	290170	0.011	1.051
1985	26283472	0.836	8084751	0.050	146451	0.002	13128879	0.087	413634	0.015	0.990
1986	31162763	0.966	8786751	0.053	219449	0.002	10326839	0.067	481946	0.017	1.106
1987	29114494	0.884	8623045	0.051	214514	0.002	12218173	0.078	519498	0.018	1.033
1988	30735984	0.915	9028399	0.053	261718	0.003	9883815	0.055	763305	0.026	1.051
1989	29511450	0.860	7893789	0.045	238940	0.002	9809049	0.055	728147	0.024	0.987
1990	37244107	1.052	9115821	0.050	302887	0.003	11466820	0.055	1113127	0.036	1.196
1991	46322490	1.288	9562645	0.052	249461	0.002	11669561	0.055	1106173	0.035	1.433
1992	51952791	1.435	10563077	0.057	297899	0.003	12179121	0.070	1425644	0.045	1.610
1993	48976055	1.328	10847603	0.058	250089	0.002	13129571	0.074	1440042	0.045	1.507
1994	55000118	1.463	10976384	0.057	228672	0.002	11900448	0.066	2533255	0.077	1.665
1995	66519954	1.733	12608182	0.064	368424	0.003	11056435	0.060	1793827	0.053	1.914
1996	45323760	1.161	18066232	0.090	144813	0.001	10376023	0.056	1531184	0.045	1.353
1997	52549777	1.322	25201101	0.123	163648	0.001	10452617	0.055	1454089	0.042	1.544
1998	51406730	1.270	36771913	0.178	342939	0.003	11570733	0.060	1964063	0.055	1.565
1999	52509437	1.271	44371059	0.210	415701	0.004	11461097	0.058	1278642	0.035	1.579
2000	50350768	1.210	50660623	0.238	338619	0.003	12178325	0.061	2085830	0.057	1.569
2001	61168028	1.479	55346784	0.262	334859	0.003	12528924	0.063	1975201	0.054	1.861
2002	56624910	1.367	56742781	0.266	60842	0.001	14455775	0.073	3329411	0.091	1.797
2003	61162829	1.457	63785954	0.291	417416	0.004	15432329	0.077	3677170	0.100	1.927
2004	56138448	1.313	44837664	0.197	279558	0.002	17900645	0.087	3155466	0.084	1.683
2005	64145679	1.484	60475864	0.272	345713	0.003	18692965	0.090	3518946	0.092	1.942
2006	67100339	1.536	51944286	0.237	375740	0.003	15501651	0.074	4129631	0.107	1.957
2007	79858705	1.811	51849554	0.252	411178	0.003	15561020	0.074	4956457	0.127	2.268
2008	72330061	1.623	53453984	0.274	291547	0.002	17189037	0.081	4905179	0.125	2.105
2009	70994308	1.575	52488246	0.274	330824	0.003	23165590	0.107	4135913	0.104	2.064
2010	75257573	1.654	66943785	0.349	395893	0.003	29964405	0.138	6050382	0.151	2.295
2011	86348271	1.878	92759623	0.490	426106	0.003	30512411	0.139	6358421	0.158	2.668
2012	82169059	1.802	123556630	0.670	470180	0.004	33174673	0.152	10520799	0.263	2.891
2013	76965541	1.675	123567890	0.672	540155	0.004	34116741	0.155	7135519	0.178	2.684
2014	72276640	1.558	114936475	0.621	914195	0.007	29574010	0.133	6288165	0.156	2.475
2015	83872311	1.792	112092935	0.601	1102990	0.008	29086536	0.130	6308155	0.155	2.686
2016	87789268	1.855	67027738	0.344	1312942	0.010	30432836	0.134	6288053	0.153	2.495
2017	86824815	1.814	69576054	0.346	1139781	0.009	22159902	0.097	6763636	0.162	2.428

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