Projections of tobacco production, consumption and trade to the year 2010

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FOREWORD

FAO shares international concern over the harmful effects of tobacco smoking and the rising incidence of smoking-related diseases, which along with the resultant personal and social distress also lead to associated economic losses, not only in the developed countries but also in the developing world, where consumption continues to expand. FAO supports measures to curtail smoking, and within the context of interagency cooperation, particularly within the United Nations Ad Hoc Inter-Agency Task Force on Tobacco Control, FAO has undertaken a project involving a number of studies into various aspects of the global tobacco economy. This project, **Tobacco Supply, Demand and Trade by 2010: Policy Options and Adjustment** was supported by the Government of Sweden through its international development cooperation agency SIDA. These studies focus particularly on the potential effects, if any, that reductions in global demand might have on the economic conditions, earnings and food security of farming communities in developing countries particularly dependent on tobacco production for their livelihood. The underlying goal of this research is to provide a well defined and thoroughly researched analysis of economic issues as a basis for promoting the necessary international and national measures to achieve a healthier and more economically sustainable global environment.

This is the first of two volumes[1] to be published from the FAO project. It provides projections to the year 2010 of tobacco production, consumption and trade, and contains also a review of developments in the global patterns of production, consumption and trade since 1970.

More than any other agricultural commodity, the future of tobacco is likely to be influenced by the various policies adopted in individual countries to reduce smoking. These projections present the results of two alternative scenarios, one being a continuation of existing policies, the other the outcome of a more restrictive set of policies. However, we can only guess at the stance which governments around the world might adopt with respect to tobacco consumption in the course of the coming decade. Levels of production and consumption may prove to be much lower than these estimates in the event that aggressive anti-smoking policies are adopted, particularly in some of the major consuming countries in the developing world. Nevertheless, it is hoped that these projections will provide a useful framework by which to assess the likely future of the global tobacco economy.

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[1] The second volume, *Issues in the global tobacco economy: Selected case studies,* is intended to provide a closer look at the tobacco economies of a few selected countries.

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EXECUTIVE SUMMARY

This study aims to provide a forward picture for world tobacco leaf consumption, production and trade to the year 2010. The projections take account of the various factors that influence tobacco consumption, production and trade. The study analyses, first, trends and determinants in tobacco consumption, production and trade during the period 1970 to 2000, and it provides consistent projections to 2010 using a standard commodity model approach.

Trends and determinants in the period 1970 to 1998

Demand for tobacco products increased rapidly and world tobacco leaf consumption increased by about 2 percent annually between 1970 and 1998, from 4.2 million tonnes to 6.5 million tonnes of tobacco leaf equivalent in dry weight. In 1998, over 65 percent of the world total, that is about 4.2 million tonnes, was consumed in the developing countries and the remaining 2.2 million tonnes was consumed in the developed countries. The trends over the examined period in developing and developed countries are quite divergent. Consumption in developed countries declined by about 0.2 percent annually while consumption in the developing countries increased at a rate of 3.1 percent annually. Much of the increase in developing country consumption is accounted for by China where consumption increased from a little under 0.7 million tonnes in 1970 to 2.6 million tonnes in 2000. The major factors that fuel increasing consumption in developing countries are principally high population and income growth give a strong boost to consumption of tobacco products in developing countries, thus increasing their share in world consumption to 65 percent in 1998.

Global **production** of tobacco leaf increased from 4.2 million tonnes in 1971 to 5.9 million tonnes in 1997 in dry weight. However, this growth took place almost entirely in developing countries, while production in developed countries declined, thus reducing further the share of developed countries in world production and in the world tobacco economy. Production has been shifting to developing countries. China, with over 35 percent of world production, is the major producer. Although its production declined after a peak in 1997, this decline should be seen as temporary and is mainly due to stock accumulation in the past. Growth is expected to revive.

Production policies supporting tobacco in developed countries are under constant pressure and tobacco profitability at farm level is expected to decline further. Conversely, tobacco production returns and tobacco profitability in most developing countries are much higher than in any other cash crop and thus there are good prospects for increasing production, especially of those types of tobacco which have an expanding world market. Thus, the developing countries are expected to further increase their share in world tobacco production.

Cigarette production was in the past located mostly in developed countries, but since the mid-1980s cigarette manufacturing has been increasing rapidly in developing countries and is surpassing the production level of developed countries. Much of this change is attributed to developments in China. Also, major multinationals with foreign direct investment have increased cigarette production in developing countries, where most of the growth takes place. Trends among tobacco types show that the Virginia type has stronger growth, reflecting consumption choices for certain cigarette types. A third point is that, in almost all tobacco types, a shift of production is observed from developed to developing countries, thus increasing developing country share in world tobacco leaf production.

Trade in tobacco was in the past almost entirely in the form of tobacco leaf, but trade in cigarettes has increased rapidly. Tobacco leaf is not a homogenous product and, thus, it is difficult to speak about a world market for tobacco. Various types of tobacco leaf are traded and many countries are involved in the trade as exporters and importers.

About 25 percent of world tobacco leaf production is traded internationally and this proportion has remained rather stable or increased slowly during the period 1970 to 1998. Developing countries

evolved during this period as major exporters of tobacco leaf with Brazil, Zimbabwe and Malawi in particular considerably increasing their exports over time. Traditional exporters such as the United States, the EU and Turkey are losing export market shares, while the developed countries are becoming major importers of tobacco leaf. The United States, the EU, and the area of the former USSR are the largest importers.

Also, trade in cigarettes increased rapidly from the mid-1980s to the mid-1990s, showing, however, a rather strong decline in the late 1990s. The decline can be attributed mainly to the decline in imports in the developed countries. This observation implies a continuing shift in cigarette production from developed to developing countries, as happened with the production of tobacco leaf.

Projections to 2005 and 2010

The objective of the study is to project likely consumption, production and trade patterns for tobacco leaf to the year 2010. The methodology used in the projections is a standard commodity model, albeit with significant simplifications, mainly due to lack of price data and other constraints and limitations.

Projections were undertaken using two alternative scenarios, a baseline and a policy scenario. The baseline scenario assumes continuation of present policies with respect to production support and consumption taxation. It thus assumes no change in real prices throughout the projection period. The policy scenario assumes adoption of strong policy measures against tobacco consumption and production that include increasing consumption taxation and reducing production support. As a result of such measures, it is assumed that consumer prices would increase by 30 percent and production support would be reduced by 40 percent in the developed countries and by 20 percent in the developing countries.

Demand. World tobacco demand in the baseline scenario is expected to increase in 2010 to 7.1 million tonnes in dry weight, reflecting, however, two different tendencies. In developed countries overall demand is declining slowly and it is expected to be at about 2.05 million tonnes in 2010, or about 10 percent lower than the 2.23 million tonnes consumed in 1998. However, consumption in developed countries in 2010 is expected to represent only 29 percent of the world total, down from 34 percent in 1998, the remaining 71 percent being the demand in the developing countries. Thus, the world picture of tobacco demand in the future is determined mainly by the developing countries.

Tobacco consumption in developing countries is expected to increase to 5.09 million tonnes in dry weight, up from 4.2 million tonnes in 1997-1999. This represents an average annual growth rate of 1.7 percent between 1998 and 2010, significantly lower than the 2.8 percent rate observed in the developing countries in the period 1971 to 1998. About 80 percent of the projected increase in demand is expected to be in the Far East, particularly in China. The share of China in total world tobacco demand is likely to increase to 43 percent in 2010, up from 38 percent in 1991.

The overall increase in world tobacco consumption, however, conceals the fact that tobacco consumption per adult is declining, in both the baseline scenario and the policy scenario. The projection results show that in the baseline scenario consumption per adult in 2010 will decline below 1.5 kg/year and in the policy scenario to about 1.3 kg/year, or a decline of almost 10 percent in the baseline scenario and almost 20 percent in the policy scenario. Consumption per adult is declining not only in developed countries, but also in developing countries and in China, albeit modestly. This significant development, however, is concealed by the fact that overall world tobacco use is expanding with population.

Production. World tobacco production is projected to reach over 7.1 million tonnes in 2010 in the baseline scenario and over 6.4 million tonnes in the policy scenario, or about 8 percent more than 1998 production levels. However, this production level is a still lower than the record world production level of 1992-1993.

Production of tobacco leaf in developed countries declined steadily during the 1990s and is expected to continue to decline during this decade with overall production expected to be a little over 1.0 million tonnes in 2005, but declining to below one million tonnes in 2010. In developing countries, however, tobacco leaf production continues to increase, thus expanding the developing countries' share in world production from about 76 percent in 1991 to 87 percent in 2010. China is projected to remain the world's largest producer with over 2.6 million tonnes in 2010, well above India and Brazil. Malawi and Zimbabwe, although major exporters, have much lower production levels.

Trade flows are determined by trends in demand and supply in trading countries and regions of the world, but are also influenced by policies such as tariffs and non-tariff barriers, export promotion and domestic policy. In projecting trade flows in the baseline and policy scenarios no changes were assumed other than those for supply and demand. That is, in both the baseline and the policy scenarios, it is assumed that there would be no change in any policies such as tariffs or non-tariff barriers, and export promotion policies.

The volume of tobacco exports is projected to increase but at a much slower annual rate of about 0.8 percent in the baseline scenario and 0.6 percent in the policy scenario during the period 1998 to 2010. The volume of exports is expected to reach 2.2 million tonnes in the baseline scenario and 2.16 million tonnes in the policy scenario, up from 2 million tonnes in 1998 and 1.7 million tonnes in 1991. The volume of imports is expected to increase to about 2.2 million tonnes in both the baseline and policy scenarios, showing an average growth rate of 0.7 percent per year. In the developed countries import requirements are expected to increase considerably while export availability declines. Conversely, in the developing countries, export availabilities are projected to expand more than import requirements, as production shifts from developed to developing countries.

Exports from developing countries such as Brazil, Malawi and Zimbabwe are very price-competitive and their economies, in particular the last two, depend heavily on tobacco. These countries are likely to continue to compete successfully with other exporting countries. For example, the export unit value of tobacco leaf from the United States is more than twice the world average, reflecting the higher quality but also higher production cost of US tobacco. The wage rates in developed countries are much more higher than in these developing countries. With cigarette manufacturers able to develop new processing technologies that allow them to use lower quality leaf, countries such as Brazil, Malawi and Zimbabwe would be able to compete more effectively with the United States and other countries in tobacco markets, increasing their shares of the world market. Any reduction in support for tobacco production, for example, would change the location of world tobacco production in favour of developing countries, such as Brazil, Zimbabwe, Malawi, and perhaps India, Turkey and China.

Overall conclusions and policy implications

Tobacco demand at the world level, during the period to 2010, is increasing but at much lower rates than in previous periods This increase is expected in spite of declining tobacco consumption on a per adult basis by as much as 10 percent between 1998 and 2010 in the baseline scenario and by as much as 20 percent under an aggressive anti-smoking and anti-tobacco policy. According to the projection results, the expansion of demand in the developing countries is expected to drive the tobacco economy of the world. Production of tobacco leaf responds to demand trends and is increasing in countries where demand is increasing, production costs are low, and there are no production restrictions, as well as in countries with good transportation systems and access to the international market. Hence, some further shift of tobacco leaf production towards developing countries is expected.

Given the above general conclusions, public policy that aims to reduce tobacco use may need to focus on demand. Reducing demand markedly in the developing countries in the medium term, as has happened during recent years in developed countries, would be a rather difficult task given projected trends in population and income growth. Mitigating these trends, however, reducing consumption with a combination of tax and direct restriction policies is feasible and would be an important achievement.

1   INTRODUCTION

1.1   BACKGROUND AND CONTEXT OF THE STUDY

Tobacco has been used by people for centuries, but cigarette smoking and large scale cigarette manufacturing appeared only in the 19th century. Cigarette smoking has since spread worldwide and in 2000 about one in three adults, or about 1.1 to 1.2 billion people worldwide, smoked. It is estimated that smoking is responsible for four million deaths in the world each year (WHO, 1999a). The number of smokers is expected to increase to 1.6 billion people by 2025 as a result of growth in adult population and increased tobacco consumption (World Bank, 1999).

Consumption of tobacco and tobacco products, by smoking in particular, is considered to impose a net social cost to society. Smoking and tobacco use are increasingly considered to have acquired the dimensions of an epidemic. According to various studies, tobacco related deaths will rise dramatically over the next 25 years, unless current smokers quit smoking (World Bank, 1999, p.80).

Tobacco and tobacco products, however, are produced, traded and consumed legally, as all other products, and their production and trade is subject to the same rules and regulations as all other products. Thus, although many countries take active measures to reduce smoking and other tobacco use as a policy for reducing tobacco-related social costs, economies of other countries have to depend heavily on tobacco growing and tobacco-related manufacturing for employment and income.

1.2   OBJECTIVES, CONSTRAINTS, CAVEATS AND DATA AVAILABILITY

The objective of this study is to provide a forward picture of tobacco production, consumption and trade to 2010. The specific objective is to use a standard commodity production, consumption and trade framework to construct a model for the major tobacco producing, consuming, importing and exporting countries and apply the model to project tobacco production, consumption and trade to 2010 for all countries and for the world as a whole. The projections should take account of changing consumer habits, technologies and likely developments in national and international policy relating to tobacco, in particular the likely impact of the Framework Convention on Tobacco Control (FCTC). Alternative scenarios incorporating various price and non-price policy measures including raising cigarette taxes, reducing protection to tobacco production and the adoption of bans on advertising and promotion of cigarettes in various countries could be incorporated as appropriate.

1.3   METHODOLOGICAL CONSIDERATIONS

The work includes two parts. The first part provides a detailed account of trends and their determinants in tobacco consumption, production and trade over the past 30 years. The second part provides consistent projections to 2010 of tobacco consumption, production and trade, using a standard commodity model approach.

The first part focuses on the period 1970 to 2000 and reviews past trends in tobacco leaf production, cigarette and tobacco leaf consumption, tobacco product manufacturing and trade in tobacco leaf and tobacco products. The review uses, whenever possible and at least for the major producing and consuming countries, econometric work for estimating supply response parameters, income elasticities of demand, and price transmission from the international to the domestic markets. The review includes two commodities, tobacco leaf and tobacco products (mainly cigarettes).

The second part focuses on projections of tobacco leaf production, demand and trade to the year 2010. The methodology is based on a standard commodity model. The base year is 1998 (in fact the average of the three years 1997-1999). The model was built using the parameters estimated in the first part with historical data from the period 1970 to 2000. Then, the results are examined at the country level for conformity with a priori knowledge about developments in the particular country concerning production policies, consumption trends and restrictions, as well as trade flows. The consistency of trade flows with production and demand projections is also ensured.

1.4   STRUCTURE OF THE REPORT

The structure of the report follows the methodology outlined above. The first part examines production of tobacco leaf, consumption of leaf and cigarettes, cigarette manufacturing and tobacco leaf usage, and trade in tobacco products during the period 1970 to 2000. Then the second part examines the projections of consumption, production and trade of tobacco leaf. Two annexes provide statistical details for the world and for major countries and details of the methodology used in the projections.

2   PAST TRENDS AND DEVELOPMENTS

Over the past thirty years, 1970 to 2000, world tobacco consumption, production and trade have increased steadily. During the last decade, however, they have slowed down. This slowdown, or even decline in several cases, is more pronounced in developed countries, while tobacco production and use is still increasing in the majority of developing countries. Among the latter, China has been a major determinant of world trends with over one third of world tobacco production and consumption. Tobacco consumption in China, although growing more slowly, is still increasing. China, in addition, is an important importer and exporter of unmanufactured tobacco. The other major exporters are Brazil, the United States and India, while major importers are the United States, the EU and Russia.

This chapter examines in detail observed trends and their determinants in tobacco production, consumption and trade during the period 1970 to 2000. The first section examines trends in consumption of tobacco leaf, cigarettes and other tobacco products. Tobacco leaf consumption in dry weight increased from about 4.7 million tonnes in 1971 to 7.8 million tonnes in 1997. This increase occurred almost entirely in the developing countries, most of it in China. The next section examines trends in the production of unmanufactured tobacco leaf. World tobacco leaf production increased from 4.7 million tonnes in 1971 to 8.9 million tonnes in 1997, but evolved differently in different regions, with a shift in production observed from developed to developing countries. A major increase in production has taken place in China, which increased its share in world production from 17 percent in 1971 to 47 percent in 1997. The following section examines trends in cigarette manufacturing and tobacco leaf usage and also the types of tobacco produced and used. Virginia flue-cured tobacco is the predominant type with increasing share in total tobacco production. Finally, the last section examines trends and developments in world trade in unmanufactured tobacco leaf and in tobacco products such as cigarettes. World trade in tobacco increased from 1.3 million tonnes in 1971 to 2.0 million tonnes in 1997, while trade in cigarettes increased fivefold during the same period.

2.1   CONSUMPTION OF TOBACCO PRODUCTS

Tobacco consumption almost doubled over the examined period from 4.2 million tonnes in 1970 to over 7.4 million tonnes in 2000. Although tobacco consumption, unlike production, is not normally expected to experience wide fluctuations, available consumption data on apparent tobacco consumption are usually calculated from supply utilization accounts and consumption of tobacco products is calculated as production plus imports minus exports. Thus, much of the observed volatility in tobacco consumption figures can be attributed to fluctuations in stocks for which there are no available comparable data.

Consumption of tobacco products is increasing rapidly around the world, but with strikingly divergent patterns. In developed countries, consumption per capita is higher but declining, while in the developing countries (where consumption per capita is lower) it shows an increasing trend.

The major factors that fuel the increase in consumption in developing countries are principally high population and income growth. High income growth coupled with high income elasticities boost consumption of tobacco products in populous countries such as China, India and Brazil, thus increasing the share of developing countries in world consumption. However, other factors, for example advertising, also have a strong positive effect on consumption. Total tobacco consumption in developing countries increased, with an average annual growth rate of 5 percent, over the 1970 to 2000 period.

Much of this growth should be attributed to China and, given China's position in world tobacco demand, developments in tobacco demand in China will be crucial for overall world demand in the future. Nevertheless, given that China has operated a more or less closed tobacco economy, very little change will be felt in the world market, unless the pattern changes considerably with China's admission to WTO.

Tobacco demand is responsive to prices and taxes, and thus excise taxes represent an effective policy instrument for reducing consumption. Tobacco consumption is not similar to other products because it is addictive. Habit formation, therefore, represents an important determinant of consumption. For this reason counter-advertising, restrictions, labelling and anti-smoking campaigns have a strong impact on demand, particularly on youth smoking.

Demand for tobacco leaf is derived from consumer demand for cigarettes and other tobacco products. This section examines consumption trends over the 1970 to 2000 period. It examines, first, overall tobacco consumption in tobacco leaf equivalent and then consumption of cigarettes and other tobacco products.

2.1.1   Major trends in world tobacco consumption in tobacco leaf equivalent

World tobacco consumption increased by over 75 percent during the period examined, from 4.2 million tonnes in 1970 to reach 7.4 million tonnes of tobacco leaf equivalent in dry weight in 2000. Over 70 percent of the world total, that is about 5.3 million tonnes, is consumed in the developing countries and the remaining 2.1 million tonnes is consumed in the developed countries. The trends over the examined period in developing and developed countries are quite divergent, as shown in Figure 2.1. Consumption in developed countries declined from 2.3 million tonnes in 1970 to 2.1 million tonnes in 2000, while consumption in the developing countries increased from 2.1 million tonnes in 1970 to 5.3 million tonnes in 2000. Much of the increase in developing country consumption is accounted for by China where consumption increased from a little under 0.7 million tonnes in 1970 to 2.6 million tonnes in 2000.

Growth rates also vary considerably. World tobacco leaf consumption during the period 1970 to 2000 increased by about 2 percent annually. In developed countries tobacco consumption declined by 0.2 percent annually while in developing countries it increased by 3.1 percent annually.

Consumption shares for the world in 2000, shown in Figure 2.1, were 9 percent for the European Union, 35 percent for China, 6 percent for the United States and 44 percent for the rest of the world.

Figure 2.1 Leaf – consumption trends (1970-2000) and shares (2000)
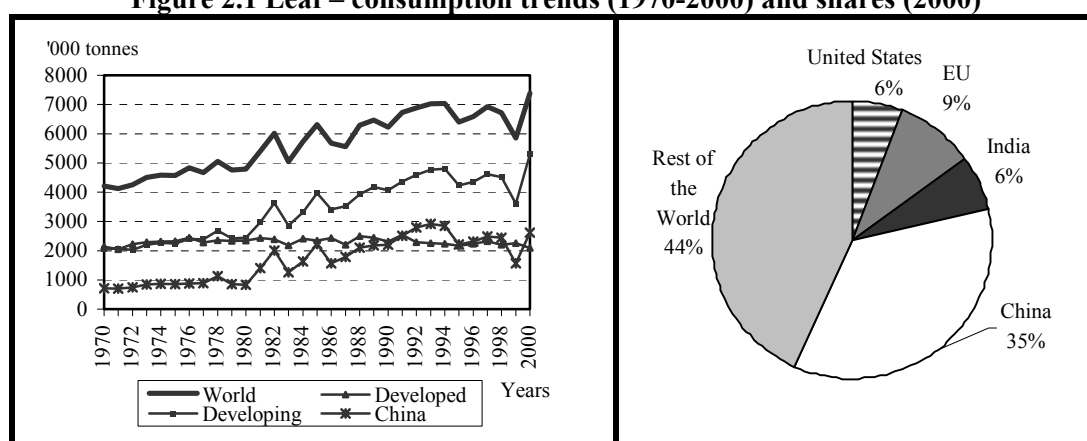
Developed countries

Aggregate consumption in developed countries declined over the period examined by 5 percent in total, or at an annual rate of 0.2 percent per year. With population growth, this implies a rather stronger decline in consumption per capita. This development can be attributed to various factors. First, income and population growth are slowing down considerably. Second, an increasing awareness of the health effects of tobacco consumption, together with the anti-smoking measures of governments

including the intensification of campaigns against smoking, the banning of advertising and increased taxation, have had a strong negative effect on consumption of tobacco products.

Among the developed countries the decline in consumption is most pronounced in North America where tobacco consumption declined steadily during the period 1970 to 2000 at an average rate of 1.3 percent per annum.

In Europe consumption increased slowly to 1990, but subsequently declined by about 2.9 percent annually. Despite this decline, tobacco consumption in the European Union is still higher than in 1970 by 50 000 tonnes. Germany and the United Kingdom, followed by France and Italy, are the biggest markets for tobacco products in Europe.

Tobacco consumption in the area of the former USSR, after a small increase to 1990 and a rapid decline during the period of transition in the early 1990s, is increasing steadily and shows a growth of 1.1 percent per annum during the period 1970 to 2000.

In the other developed countries group, including Oceania, Japan, Israel and South Africa, tobacco consumption has followed a slow decline with an average annual rate of about 0.7 percent during the examined period.

Developing countries

In sharp contrast to the developed countries, consumption in developing countries increased rapidly during the period 1970 to 2000, with growth averaging about 5 percent per annum. Aggregate consumption increased by 70 percent over the thirty-year period. This is due to a large extent to developments in the two most populous countries of the world, China and India, but also to a rapid increase in tobacco consumption observed across all developing countries and is related to a large extent to population and income growth.

In China aggregate tobacco consumption increased more than fivefold from 0.8 million tonnes in 1970 to 4.2 million tonnes in 1997. After 1997 however, consumption declined and it was estimated at 3.1 million tonnes in 2000. This wide fluctuation in apparent consumption is attributed to the large build up of stocks during the early 1990s which in a supply utilization account show up as apparent consumption. Also, it is assumed that large stocks are held at the household level due to the consumption behaviour in China where packs of cigarettes are often offered as gifts. Therefore, real aggregate consumption is more modest than the 1997 figures show. The 2000 figure of 3.1 million tonnes is however regarded as close to reality and this represents a consumption increase between 1970 and 2000 of 4.4 percent per annum.

In India total consumption has been increasing as in many other countries, notwithstanding the increasing awareness of the ill-health effects of tobacco consumption. Aggregate consumption has doubled in the thirty-year period from 275 000 tonnes in 1970 to 550 000 tonnes in 2000, representing an average annual growth rate of 3.3 percent. Non-cigarette consumption represents about four fifths of total consumption in India and this has remained more or less stable during the period. These tobacco products include particularly bidi, a kind of hand rolled, non-manufactured cigarette, produced by the informal sector, as well as natu, hookah, snuff, etc. About 80 percent of smokers live in the urban areas. The consistent growth in the bidi sector is mainly due to the lower level of taxation which has provided a considerable price advantage to bidis over cigarettes. Other factors that account for the rapid rate of growth in bidi consumption is the traditional habit of bidi smoking in the family which is passed on to the young, the relatively low income among a large population especially in rural areas and the increased use of bidi by women. The smokeless tobacco products, commonly used by the rural masses, were not taxed until the early 1990s, and currently are taxed only lightly. In contrast, taxation of cigarettes has increased by almost 15 times since 1970, encouraging many

cigarette smokers to become consumers of bidis. The Indian tobacco market seems to be highly price sensitive.

In other countries of the region consumption has also increased. In Indonesia aggregate consumption increased three and a half times or at a rate of about 5.5 percent per annum. In the Philippines, in the period 1970 to 2000, consumption increased tenfold, whilst in the Republic of Korea it almost doubled.

In Latin America aggregate tobacco consumption experienced an increase of 2.8 percent per annum. Brazil is the largest market, accounting for half the region's consumption. Consumption in Brazil increased over the 1970 to 2000 period at 2.0 percent per annum. Total regional consumption declined in the 1980s due to a decline in incomes, but it started increasing again in the 1990s. Similar consumption patterns are followed in the rest of the region.

In the Near East region the major market is Turkey with about half of the regional consumption. Aggregate consumption in the region doubled from 140 000 tonnes in 1970 to 300 000 tonnes in 2000.

In Africa aggregate tobacco consumption increased steadily but modestly from 160 000 tonnes in 1970 to 235 000 tonnes in 1999.

2.1.2   Consumption of cigarettes

Although tobacco is consumed all over the world, consumption of tobacco products varies widely from region to region. Cigarette smoking is the most prevalent type of tobacco consumption. Manufactured cigarettes, together with the hand rolled bidis consumed in South Asia, account for about 85 percent of all tobacco consumed worldwide. However, in some regions, such as South Asia, unmanufactured tobacco is also widely consumed.

There are four common types of cigarettes consumed: (a) Virginia type, made from manufactured flue-cured tobacco, consumed mainly in the United Kingdom and North America; (b) dark tobacco type, consumed mainly in French, Portuguese and Spanish speaking countries; (c) blended types, manufactured from various leaf types and consumed mainly in North America and internationally, manufactured under licence in various countries and sold world-wide; and (d) aromatic tobacco, made principally from oriental types of tobacco, consumed mainly in the Near East.

World cigarette consumption increased from about 3 million tonnes in 1970 to 5.3 million tonnes in 1999 (see Figure 2.2). Details of the evolution of cigarette consumption by country and region are given in Annex A.

Figure 2.2 Cigarettes - consumption trends (1970-2000) and shares (1999)
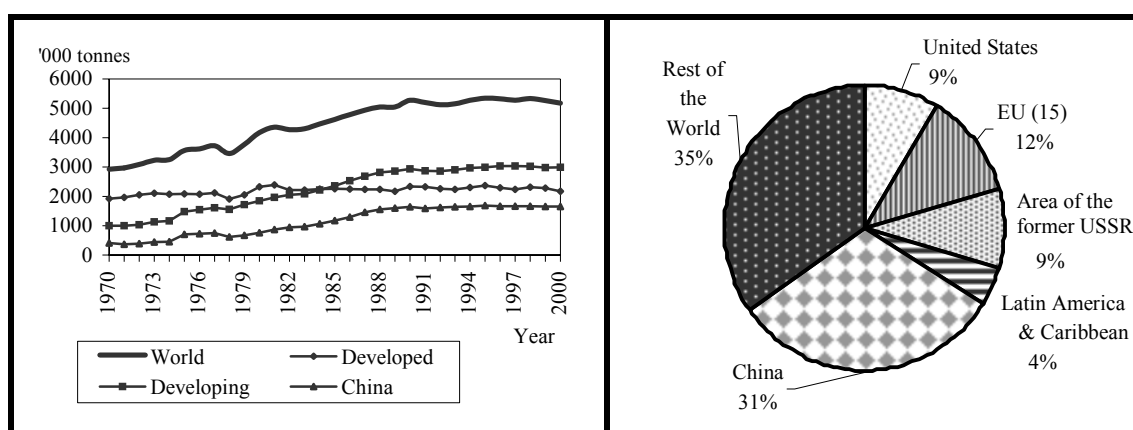
Total world cigarette consumption increased during the period 1970 to 2000 at about 2 percent annually. There are striking differences, however, in the evolution of cigarette consumption between developed and developing countries. Total consumption in developed countries increased from 2 million tonnes in 1970 to 2.2 million tonnes in 1999, or an increase of just 10 percent over the thirty-year period. At the same time, cigarette consumption in developing countries increased from 1 million tonnes in 1970 to almost 3 million tonnes in 2000 or a threefold increase over a thirty year period, representing an annual growth rate of about 6 percent, as shown in Figure 2.3.

Much of the difference in consumption patterns in developed and developing countries can be attributed to differences in population and income growth. Consumption per capita increased in developing countries at a much slower rate, while it declined in developed countries. The proportion of adults who smoke has declined, although more women have taken up smoking.

As a result of such trends, developing countries now have a much higher share in world cigarette consumption, with China, the United States and the EU leading in cigarette consumption share (see Figure 2.2).

An important development has been the rapid growth in demand for filter-tipped cigarettes and the demand for 'light cigarettes'. The increasing consumption of filter-tipped cigarettes had a profound impact on the demand for tobacco leaf and the tobacco industry worldwide. The introduction of filters reduced tobacco leaf use in cigarette manufacturing by as much as 30 percent in comparison with thirty years ago. Furthermore, several other innovations in cigarette manufacturing, such as the introduction of additives, looser packing, reduction of waste, etc, have further reduced demand for tobacco leaf at the industry level.

Figure 2.3 Cigarettes – per capita consumption, 1970 to 2000
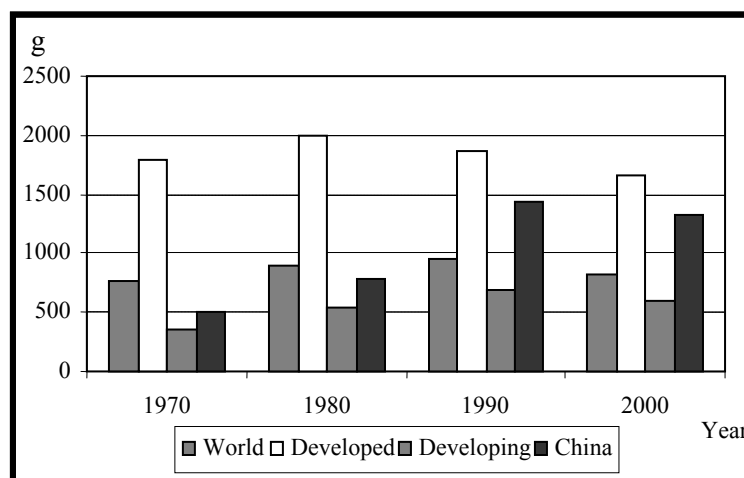
Developed countries

In developed countries, cigarette consumption per capita peaked at about 2000 grams per capita per year in the early 1980s and subsequently declined. Overall, during the period 1970 to 2000, cigarette consumption showed a slow annual increase of about 0.4 percent. Among developed countries, Japan's cigarette consumption increased from 237 000 tonnes in 1970-72 to 332 000 tonnes in 1999 showing a growth rate of 0.7 percent per annum. In the area of the former USSR consumption increased from 387 000 tonnes in 1970-72 to 472 000 tonnes in 1999. On the other hand, United States cigarette consumption declined from 600 000 tonnes in 1970-72 to 457 000 tonnes in 1999, showing an average decline of 0.9 percent per annum. During the same period the EU (15) experienced an increase of 1 percent per annum. Other developed countries also showed stability or small declines in cigarette consumption.

Developing countries

Total cigarette consumption increased in developing countries by 3.7 percent per annum, a rate almost ten times higher than that of developed countries. The highest growth is observed in the Far East, including the two most populous countries of the world, China and India. China is the world's major cigarette consumer. Consumption increased from 388 000 tonnes in 1970-72 to 1 655 000 tonnes in 1999, representing an increase in cigarette consumption of 4.8 percent annually. Cigarette consumption in India is growing, but represents about 20 percent of total tobacco consumption in that country, the remainder being of non-cigarette products.

Latin America experienced an increase in cigarette consumption of 0.5 percent. Brazil is the most important consuming country followed by Argentina and Mexico. In Africa consumption of cigarettes is low but increasing rapidly, in particular in North Africa and Nigeria. In the Near East consumption is also increasing rapidly with Turkey the most important consuming country.

2.1.3   Consumption of other tobacco products

Most tobacco consumption is in the form of cigarettes. In fact, cigarette consumption represents more than 80 percent of total tobacco consumption worldwide, the rest being cigars (about five percent of total tobacco consumption) and unmanufactured tobacco products such as bidis, etc.

Consumption of cigars amounts to about 100 000 tonnes or just over five percent of aggregate consumption of tobacco products. At the same time, consumption of cigars is decreasing rapidly in developed countries, although it is declining less rapidly in developing countries.

In India, consumption of unmanufactured tobacco products accounts for 80 percent of total tobacco consumption, such as bidis, chewing tobacco and other products of smokeless tobacco. Bidis are manufactured in the informal sector and are not produced by tobacco companies.

2.1.4   Major factors explaining tobacco consumption growth

Population

The major factors contributing to tobacco consumption have been global population and income growth. World population increased from 3 923 million in 1970-72 to 6 288 million in 1999 (for details see Table A.a). In developed countries the increase was rather slow (from 1 087.4 million in 1970-72 to 1 302 million in 1999), while in developing countries there was a major increase from 2 835.4 million in 1970-72 to 4 986 million in 1999.

World population during the period 1970 to 2000 increased by 1.7 percent annually, ranging from 0.6 percent for developed countries to over 2 percent for developing countries. In China, population increased at 1.4 percent annually, while India experienced an annual growth rate of 2 percent and the Near East 2.7 percent.

Tobacco is consumed mainly by the adult population. With population growth slowing down, the share of adult population in total (that is the number of potential smokers) increases. About 70 percent of world population is over 15 years of age, ranging widely from about 58 percent in Africa to above 80 percent in developed countries. The difference between developed and developing countries is striking, although some developing countries such as Brazil and China are catching up rapidly (respectively 75 percent and 78 percent in 2000).

Income

Global income increased during the period 1970 to 2000 by slightly over 3 percent annually. In developed countries income increased by almost 3 percent annually, while in developing countries it increased by about 4 percent. The highest growth was observed in China with growth of about 8 percent.

The income elasticity of demand for tobacco products is found in the literature to be between 0.2 and 0.8. It is higher in developing countries and lower in developed countries, that is, as income per capita increases, the income elasticity of demand for tobacco products declines (see Zhang, 2000).

Other factors

Other factors influencing demand for tobacco include prices, habits, taxation, smoking restrictions, the most important of which is the retail price of tobacco products. The retail price, however, typically includes a very large excise tax which constitutes the largest part of the retail price. The share of tobacco leaf in the total cost of the final tobacco product is very small. Demand for tobacco products is rather inelastic. The price elasticity of demand for tobacco products varies considerably from –0.9 in most developing countries to –0.2 in developed countries. It has been found that as income per capita increases, the price elasticity of demand for tobacco products declines (see Zhang, 2000).

Consumption of tobacco products is a significant source of tax revenue for all countries. The level of taxation varies considerably between countries and across products. For example, cigarette taxation is very high in some countries, such as the United Kingdom, while it is much smaller (as a percentage of the retail price) in others, such as the transition economies of Eastern Europe. In certain countries, such as India, the various tobacco products are taxed differently. For example, cigarette consumption is taxed highly, while bidis are taxed lightly.

Taxation is probably the best public policy measure to reduce consumption of tobacco products. Given that price elasticities of demand differ by income class, with demand in the high-income strata being less price-elastic (around –0.2 to –0.3) and low-income strata having higher price elasticity (around -0.7 to –0.9) the impact of taxation is borne mainly by the higher income strata. Also, more low-income people reduce smoking as a result of an increase in taxation.

Consumption of tobacco is different to that of other products because it is addictive. Habit formation is the most important determinant of smoking patterns as studies around the world reveal. It is because of this that advertising is important in recruiting new smokers in particular among the youth. Advertising has been responsible for the observed increase in tobacco consumption in many countries, while the counter-advertising and the anti-smoking campaigns have also had significant impacts on tobacco consumption.

Smoking restrictions and labelling on tobacco products with warnings have an impact on consumption. However, in countries with rapidly increasing incomes and population, the strong positive effect of population and income growth on cigarette consumption outweighs the effect of smoking restrictions and labelling.

In recent years trade liberalization in many goods and services, including tobacco, has been implemented as a result of various international trade agreements. The removal of trade barriers introduces greater competition, lower prices, advertising and other activities that stimulate demand. Results of various studies show that cigarette consumption in countries that liberalized their trade has increased by about 10 percent more than had markets remained closed. As a result, it can be concluded that trade liberalization contributed significantly to the observed increase in cigarette consumption, particularly in the low and middle-income countries.

2.2   PRODUCTION OF TOBACCO LEAF

Tobacco is a differentiated product with certain characteristics that influence its production, consumption and trade patterns worldwide. Tobacco production takes place in many countries around the world in a variety of climates and soils, and it is used to a large extent by the producing countries themselves. Tobacco is produced in more than 100 countries in a variety of climatic conditions and soils. The major producers are China, the United States, India, Brazil, Turkey, Zimbabwe, Malawi and the EC. These produce more than 80 percent of world production.

World tobacco leaf production in dry weight increased from 4.3 million tonnes in 1970 to 8.1 million tonnes in 1997 (which was an all-time high), an increase of almost 90 percent over this period. Growth was high in developing countries, while in developed countries tobacco production declined. This trend further reduced the share of developed countries in world production and, thus, their position in the world tobacco economy.

The observed growth in production worldwide is attributed mainly to yield increases, while the area of land used for tobacco has, overall, remained rather stable. However, the area used for tobacco increased considerably in developing countries, while declining in developed countries.

Policies supporting tobacco production in developed countries are under constant pressure and tobacco profitability at farm level is expected to decline further. Conversely, returns to tobacco production in most developing countries are much higher than in any other cash crop and thus there are good prospects for increasing production, especially for those types of tobacco with expanding world markets. Thus, not only do the developing countries have a higher share in world tobacco production, but they are also expected to increase it further.

2.2.1   Major Trends

World tobacco production has evolved differently in different regions during the period examined, with a shift in tobacco production observed from developed to developing countries (see Figure 2.4). Production in developed countries decreased from about 1.9 million tonnes in 1970 to 1.2 million tonnes in 2000, a decrease of about 36 percent. In the developing countries it increased from 2.3 million tonnes in 1970 to 6.6 million tonnes in 1997 (a threefold increase) but subsequently declined to 5 million tonnes in 2000, representing a twofold increase over the period 1970 to 2000.

Figure 2.4 Tobacco leaf – production trends (1970-2000) and shares (1999)
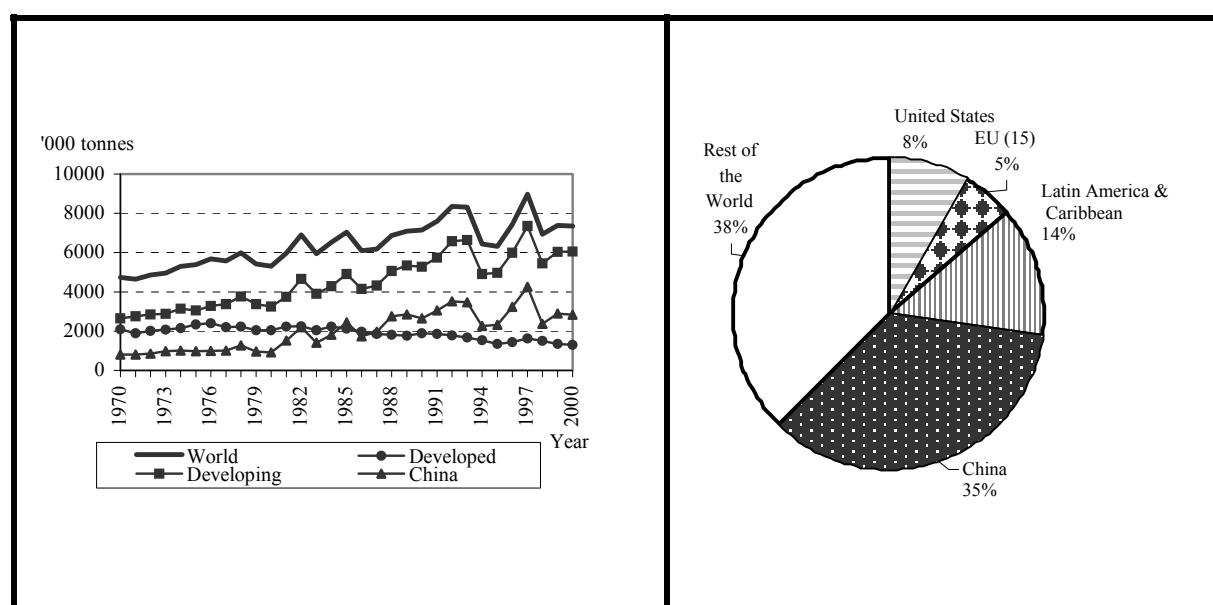
The observed growth in world tobacco production largely follows the production trends of developing countries, where there was an increase from about 2.6 million tonnes in 1970 to 5.6 million tonnes in 2000. The developing countries increased their share of world tobacco production from 55 percent in 1970 to 81 percent in 2000.

The main producer in the developing countries is China, where production increased from 805 000 tonnes in 1970 to 2.5 million tonnes in 2000, when China accounted for about 35 percent of world production and about half of the developing countries' production. (Figure 2.4).

Globally, production of tobacco grew at an average annual rate of 1.3 percent during the period 1970 to 2000, but it was higher than 2.5 percent in the developing countries. China's production expanded at 3.8 percent annually, Brazil's at 3.0 percent, India's at 2.5 percent, Malawi's at 5.8 percent and Zimbabwe's at 4.9 percent. This should be seen against the negative growth of 1.5 percent experienced by the developed countries.

The large divergence between developed and developing countries in growth rates of tobacco production is due to several factors. Tobacco use in developed countries has declined, while in developing countries demand both domestic and for exports increased rapidly, stimulating tobacco production. Support for production is on the decline in developed countries, and production costs have increased, while in the developing countries production costs are lower, and transportation has become easier. In most developing countries tobacco production is by far the most profitable among cash crops, particularly with the buoyant prices seen in the period to the mid-1980s, thus encouraging expansion of tobacco production. In addition, some of the production previously located in developed countries has been moved to developing countries with the establishment of multinational tobacco companies which invest heavily in large scale tobacco production.

The area under tobacco increased from a little less than 3.7 million hectares in 1970 to a little over 4.1 million hectares in 2000 (Figure 2.5). This increase in the global area under tobacco was almost entirely in the developing countries, mainly in China. The area under tobacco in developed countries declined by half, from 1.2 million hectares in 1970 to 0.6 million hectares in 2000. At the same time area under tobacco in developing countries increased by 1 million hectares from 2.5 million hectares in 1970 to 3.5 million hectares in 2000.

Figure 2.5 Area under tobacco (1970-2000) and shares (1999)
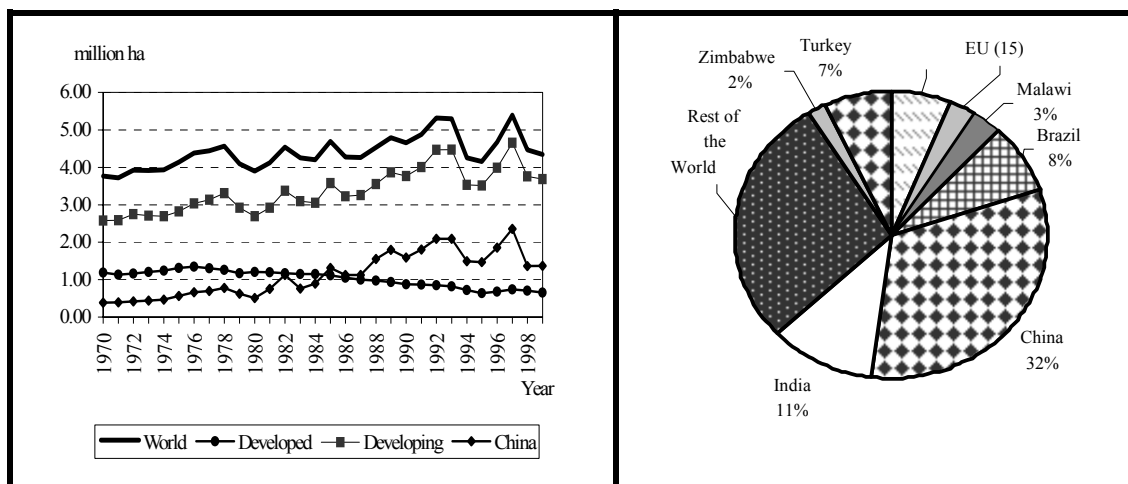
The countries that have the largest area under tobacco in the world are shown in Figure 2.5. In 1999, China accounted for 32 percent (1.4 million hectares), followed by India with 11 percent. The area under tobacco production increased in China from about 0.5 million hectares in 1970 to about 1.5 million hectares in 2000 with considerable fluctuation, such as reaching 2.3 million hectares in 1997.

Average world tobacco leaf yields increased from 1.3 tonnes/ha in 1970 to 1.7 tonnes/ha in 2000 (see Figure 2.6). This was the result of an increase in developed countries from 1.8 tonnes/ha in 1970 to over 2.2 tonnes/ha in 2000, and in the developing countries from 1 tonne/ha in 1970 to 1.6 tonnes/ha in 2000. Zimbabwe experienced a major rise in yields from 1.3 tonnes/ha in 1970 to 2.5 tonnes/ha in 2000. In contrast to most countries, China experienced a decline in yields from 2.1 tonnes/ha in 1970 to 1.9 tonnes/ha in 2000 due to the expansion of tobacco production to new, less suitable areas, and where experience in growing tobacco is limited.

Tobacco is a differentiated product, produced, used and traded in different ways around the world. Various types of tobacco are used in cigarette manufacturing, such as flue-cured, dark sun- and fire-cured, burley, oriental, etc. Flue-cured is the most common type amounting to about 60 percent of total world production. The highest observed growth between 1970 and 2000 was for the Flue cured type which is used in Virginia type cigarettes.

Figure 2.6 Tobacco leaf yields, 1970-2000
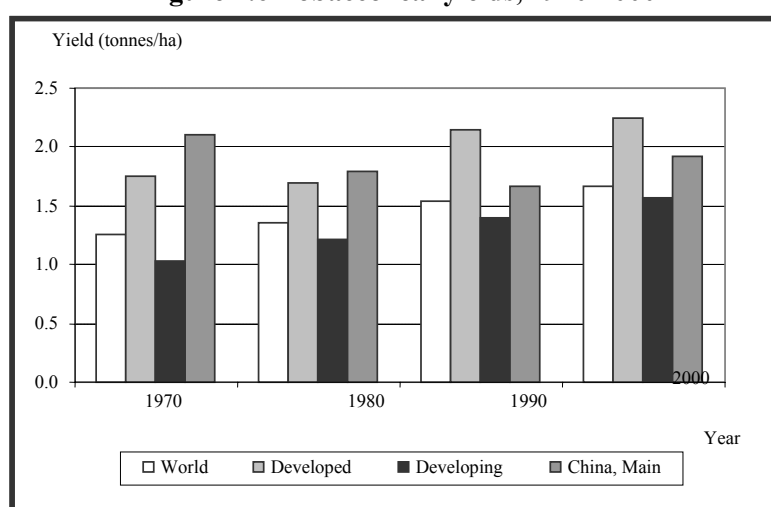
Tobacco production is regulated in certain countries by monopolies, marketing boards or producers' co-operatives and thus tobacco consumption and production levels are not determined solely by the market. Various pricing mechanisms are used, with auction pricing in some countries and for certain types, and traditional marketing arrangements for other tobacco types. Such arrangements influence the pattern of production by enhancing the incentives to produce particular types.

2.2.2   Developed countries

The developed countries share of world production declined from 44 percent of the world total in 1970 to 19 percent in 2000. Output growth in developed countries was negative during these three decades, with a faster decline of 3.4 percent a year observed between 1990 and 2000.

North American production is dominated by the United States, where production declined by 400 000 tonnes between 1970 and 2000 - an average decline of 3.8 percent annually. Its share in world production declined from 20 percent in 1970 to 8 percent in 2000.

The negative long-term trend in tobacco production in the United States is partly due to the strong pressure exercised upon the tobacco policy support programme since the beginning of the debate on the health consequences of smoking. The tobacco programme keeps prices high, but restricts quantities produced to predetermined quotas. Quota owners thus enjoy an annual income transfer from the budget through the programme. Opponents of the programme want it eliminated on the grounds that taxpayers' money should not be used to subsidise the production of health-damaging substances.

Proponents of the programme claim that the programme restricts quantities produced and that its elimination would result in higher production of tobacco products and cigarettes.

Production in Europe, split about equally between the European Union (EU) and the other Europe group (including the transition countries of Eastern Europe), declined between 1970 and 2000 from 640 000 tonnes to 530 000 tonnes, thus reducing Europe's share in world production from 14 percent in 1970 to 7 percent in 2000. There was a very small growth in output (0.2 percent) in the period to 1990, mainly due to a small increase in the EU, particularly in Italy.

Tobacco production in the EU is supported by deficiency payments. There are no border measures, but producers receive a subsidy related to a production quota. The European Parliament has called for an elimination of production subsidies within five years. Although such a decision would not be implemented without the endorsement of the Commission and the Council, it is clear that there is pressure for the tobacco policy support programme to be discontinued.

Tobacco production in other European countries, such as Bulgaria, was hit in the 1990s by the conditions of economic transition to a market economy. Although there is no significant support for tobacco production, the strengthening of the market economy and the normalization of market conditions will most probably give a boost to tobacco production.

Production in the area of the former USSR, which was stable around 260 000 to 280 000 tonnes in the 1970s and 1980s, declined during the transition period to 120 000 tonnes in 2000. This decline amounts to an average of 2.5 percent a year in the period 1970 to 2000 and the share in global production declined from about 6 percent to about 2 percent during this period.

In the other developed countries, including Japan, Israel, Africa and Oceania, production contracted by half from 220 000 tonnes in 1970 to 100 000 tonnes in 2000, that is by an average of 2.3 percent annually. This is mainly a result of the decline in production of more than 3 percent annually in Japan.

2.2.3   Developing countries

The Far East is the major tobacco producing region of the world and in 2000 it produced 55 percent of the world's tobacco leaf. China is the major producer in this region with 35 percent of total world production and about 65 percent of Far East production.

China experienced the highest increase in output during the period 1980 to 1990, with an average annual growth rate of 11 percent. During the decade 1990 to 2000 there was a decline in China's tobacco production of 0.6 percent annually. However, during the period 1970 to 2000 tobacco leaf production increased in China by 3.8 percent annually. China's tobacco production is under a State Monopoly which determines centrally all aspects of tobacco production, processing, cigarette production and trade of leaf and cigarettes. Production returns are often not higher than for other crops, but offer the advantage of lower uncertainty.

India is the second major tobacco producer in the world with about 0.7 million tonnes of production in farm weight annually. India's production grew from 0.33 million tonnes in 1970 to 0.7 million tonnes in 2000. The growth rate remained stable over the entire period examined at about 2.5 percent per annum. About two thirds of tobacco produced is of non-cigarette types (such as bidi), but growth of flue cured Virginia type is increasing rapidly and it is regulated by a Tobacco Board. Inputs to tobacco production are subsidised from government. Tobacco is by far the most profitable cash crop and thus prospects for further expansion of cigarette tobacco for the growing world market are favourable.

Turkey is the major producer in the Near East, and accounts for about three quarters of the region's tobacco production. During the period 1970 to 2000 Turkey experienced an increase in tobacco production of about 2 percent annually. Turkey is the main producer of oriental tobacco (about 65 percent of the world total). Tobacco is grown under rainfed conditions and in elevated areas, and it

uses about 1.5 percent of the total cultivated area with labour intensive methods. Production policy for tobacco includes market intervention measures for price support by accumulating stocks, which are mainly of lower quality tobacco produced in the east and south east regions, as well as the general input subsidies received by other farmers as well. Support prices and thus domestic prices received by farmers for tobacco were about 25 percent higher than world prices in 1999. A reduction in domestic price support is expected to have a significant negative impact on production. Alternative crop activities, though less profitable, do exist.

Africa is the only region that experienced a strong production increase during the period 1970 to 2000, averaging 3.7 percent per annum, but with significant fluctuations (5.7 percent, 2.1 percent and 3.3 percent in each of the three decades respectively).

The main tobacco producers in Africa are Malawi and Zimbabwe, where production expanded rapidly during the 1970s and the two countries together account now for about half of Africa's production. Output in these two countries increased by about 9 percent per annum during the period 1970 to 1980. During the period 1970 to 2000 production increased by about 6 percent annually in Malawi and about 5 percent annually in Zimbabwe. In these two countries, tobacco is produced mainly in the large scale sector of professionally managed farms and very little in the small scale sector. The growth observed during the examined period was stimulated by high world market prices in the first half of the period, strong foreign direct investment by multinational tobacco companies, introduction of new tobacco processing technologies, improved transportation and improved access to international markets.

Output of tobacco in Latin America rose by about 2 percent between 1970 and 2000. The region has a share of 13 percent in world tobacco production, of which Brazil accounts for 75 percent. The highest increase in production growth occurred for Brazil in the period 1970 to 1980, about 2.5 percent per annum, but this was followed by a major turnaround when a significant decline in growth was observed in the period 1980 to 1990, with a growth rate of only 0.9 percent annually. Overall, tobacco production in Brazil increased by an average 3 percent annually during the period 1970 to 2000. Production in Brazil has been stimulated by low production costs and by foreign investment from tobacco multinationals that focused almost entirely on the production of Virginia flue-cured tobacco to meet an expanding international market.

2.3   CIGARETTE MANUFACTURING AND TOBACCO LEAF USAGE

It is estimated that more than 80 percent of tobacco leaf is used for the production of cigarettes. The rest is consumed in the form of unmanufactured products, cigars, etc.

Cigarette production has, until recently, been located largely in developed countries for various reasons. First, consumption was concentrated in developed countries. Second, cigarette production is a capital intensive manufacturing activity and requires specialized technology, supply of materials and considerable research and development which were typically not available in developing countries. In addition, producing a consistent quality of the finished product places demands on the quality of the raw material.

Technology is an important determinant of tobacco leaf usage in cigarette manufacturing. Recent developments in cigarette manufacturing reduce the tobacco leaf usage in cigarette production by as much as 15 to 20 percent. In addition, the increasing share in the market of filter-tipped cigarettes has also reduced leaf usage.

2.3.1   Production of cigarettes

World cigarette production increased from 3 million tonnes in 1970 to 5.6 million tonnes in 2000 due to increasing production in developing countries. In developed countries, cigarette production shows only a small increase from 2 million tonnes in 1971 to 2.5 million tonnes in 1991, remaining stable around this level since.

Figure 2.7 Cigarettes - production trends (1970-2000) and shares (1999)
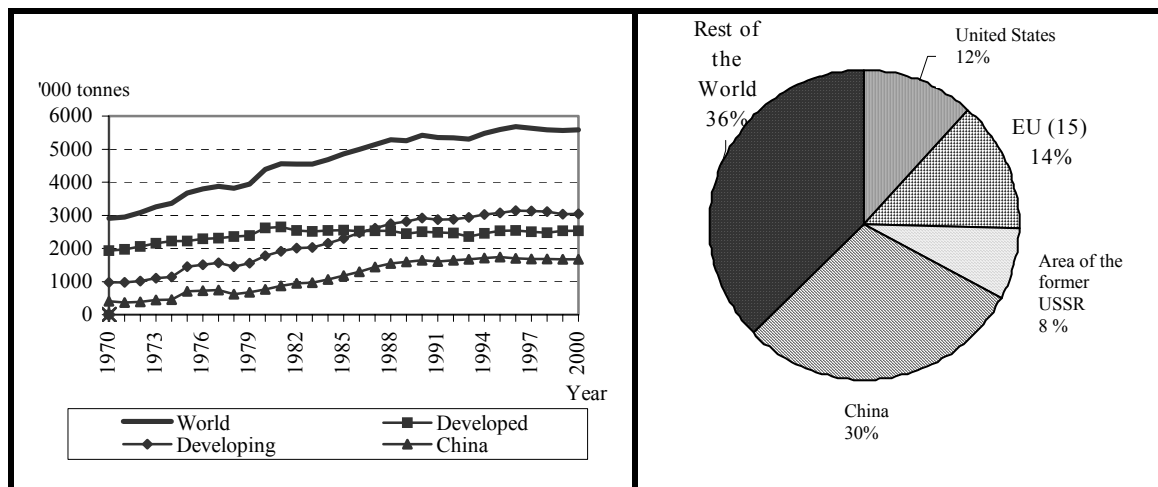
As shown in Figure 2.7, the strongest increase in cigarette production is observed in China. China is the biggest cigarette producer with 30 percent of global production, 1 675 million tonnes, in 1999, up from only 0.39 million tonnes in 1970-72. (see Table A.1.3).

Developed countries

Cigarette production in the developed countries increased by only 0.9 percent annually between 1970 and 2000, much more slowly than in the developing countries.

Production in the EU increased by 1.8 percent during this period. The EU is the second largest cigarette producer worldwide, the United States is the third and the area of the former USSR the fourth. Cigarettes production in the EU averaged 0.45 million tonnes in 1970-72, and increased in the 1990s to 0.75 million tonnes annually (see Table A.1.3).

Production in the Netherlands increased by about 6 percent per annum and the United States experienced a slower growth of 0.3 percent per annum. Cigarette production in the United States was 0.59 million tonnes annually in 1970-72, while in 1999 it was 0.65 million tonnes. In the area of the former USSR the production of cigarettes rose at 1.0 percent annually from 0.34 million tonnes in 1970-1972, to 0.42 million tonnes in 1999.

In 1999 the EU produced 14 percent of the world's cigarettes, while shares were 8 percent for the areas of the former USSR, 12 percent for the United States and 36 percent for the rest of the world (Figure 2.7).

Developing countries

Cigarette production in developing countries expanded at a rate of 3.9 percent annually between 1970 and 2000, and in that year accounted for a total of 55 percent of global production. Nearly 80 percent of developing country cigarette production is in the Far East region.

In the Far East region, cigarette production increased by 4.4 percent per annum between 1970 and 2000. The fastest growth was in Indonesia where production increased five times (6.7 percent per annum) from 0.04 million tonnes in 1970-72 to 0.2 million tonnes in 2000. China showed the second highest growth rate among developing countries with an average production growth rate of about 5

percent per annum. In India there was a slow increase in cigarette production that averaged 1.5 percent per annum.

The countries of Latin America and the Caribbean have a 5 percent share in world cigarette production. In the period 1970-72 cigarette production averaged 0.22 million tonnes per annum and after some fluctuations during the period 1973 to 1999 it reached the level of 303 000 tonnes in 1999 (Table A.1.3).

In the Near East, tobacco production increased by 4.1 percent annually from 0.08 million tonnes in 1970-72 to 0.24 million tonnes, or 4 percent of the global total, in 2000. The major producers in this region are Turkey and Egypt.

The production of cigarettes in Africa increased two and a half times from 37 000 tonnes in 1970-72 to 102 000 tonnes in 2000, a growth rate of 3.7 percent per annum, but this constitutes only 2 percent of the global total.

2.3.2   Types of tobacco used in cigarette manufacturing

Flue-cured tobacco is dominant among the various types of tobacco used in cigarette manufacturing. Out of 6.9 million tonnes of total tobacco leaf production in 1998, 4.0 million tonnes was flue-cured, representing 58 percent of the total. The other types include burley with 15 percent, dark air- sun-cured with 13 percent, and oriental with 10 percent. However, it is the development of the flue-cured type that characterizes the 1970 to 2000 period. Other types remained at much the same levels between 1970 and 2000 period (see Figure 2.8).

Figure 2.8 Tobacco types - production trends (1970-1998) and shares (1998)
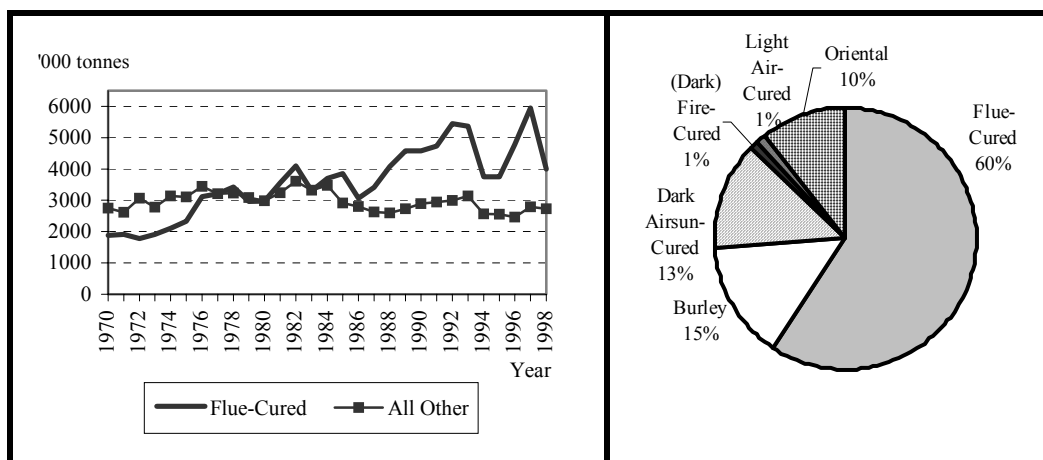
The largest producer of flue-cured tobacco is China which produced 2.17 million tonnes in 1999. Other important producers are the United States, Brazil and Zimbabwe (Figure 2.8).

2.4   TRADE IN TOBACCO LEAF AND CIGARETTES

Trade in tobacco was in the past almost entirely in the form of tobacco leaf. The proportion of tobacco traded as cigarettes, however, has increased rapidly. Tobacco leaf is not a homogenous product and thus it is difficult to speak about a world market of tobacco. Tobacco trade takes place for various types of tobacco leaf and many countries trade tobacco as both exporters and importers. About 25 percent of the tobacco leaf produced globally is traded internationally and this proportion has remained rather stable or increased slightly during the period 1970 to 2000.

During the period examined, developing countries evolved as the major exporters of tobacco leaf with leaders Brazil, Zimbabwe and Malawi increasing their exports. Traditional exporters such as the United States, the EU and Turkey have been losing export market shares. At the same time the developed countries are becoming major importers of tobacco leaf with the United States, the EU, and the area of the former USSR having the largest import shares.

Cigarette trade increased rapidly from the mid-1980s to the mid-1990s, but then showed a rather strong decline in the late 1990s.

2.4.1   Exports and imports of tobacco leaf

The world experienced a rapid increase in exports of tobacco leaf during the period 1970 to 1999. Exports of tobacco leaf averaged 1.32 million tonnes in 1970-72, and reached 2.02 million tonnes in 1999 (Figure 2.9). The year with the highest exports of tobacco leaf was 1996 (2.03 million tonnes) see Table A.3.1). Developing countries are the major exporters with Latin America and Caribbean having the highest share.

China's trade, as a proportion of its dominant production and consumption, is quite small, and this picture has not changed over the past 30 years. Even with China now a member of the WTO, trade in tobacco products may change little because the tobacco economy in China is state-managed.

Figure 2.9 Tobacco leaf – export trends (1970-1999) and shares (1999)
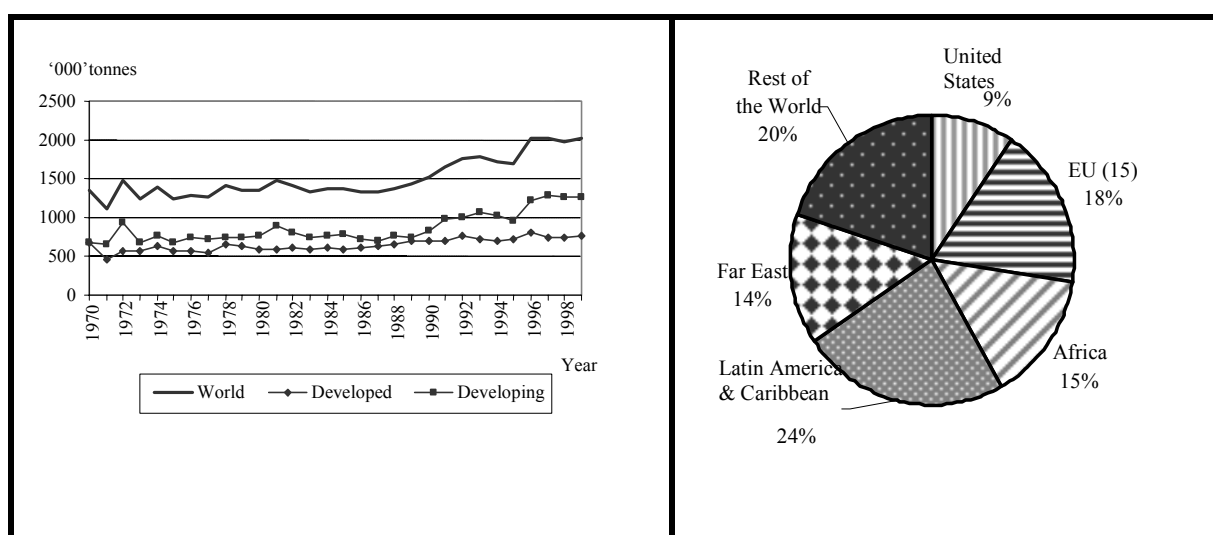
Developing countries exported about 0.75 million tonnes of tobacco leaf in 1970-72. With some small fluctuations during the period 1972 to 1999 the exports in 1999 increased to 1.26 million tonnes (Figure 2.9). The major exporters among developing countries are Brazil and Zimbabwe. Brazil's exports averaged about 90 000 tonnes in 1970-72, jumping to 340 000 tonnes in 1999. Zimbabwe's exports expanded from 60 000 tonnes to 160 000 tonnes over the same period.

Exports of leaf from developed countries increased from 560 000 tonnes in 1970-72 to 760 000 tonnes in 1999. The EU and the United States are the major exporters among the developed countries (Table A.3.1).

Developed countries, particularly the United States and the area of the former USSR, are the major importers. Tobacco leaf imports to the United States increased from 0.11 million tonnes 1970-72 to 0.24 million tonnes by 1999, while those of the area of the former USSR increased from 0.08 to 0.36 million tonnes (a fivefold increase) during the same period. The EU is a major importer with imports

of 0.40 million tonnes in 1970-72, which grew to 0.8 million tonnes in the early 1990s, but contracted to less than 0.3 million in 1999 (Table A.4.1).

Figure 2.10 Tobacco leaf – import trends (1970-2000) and shares (1999)
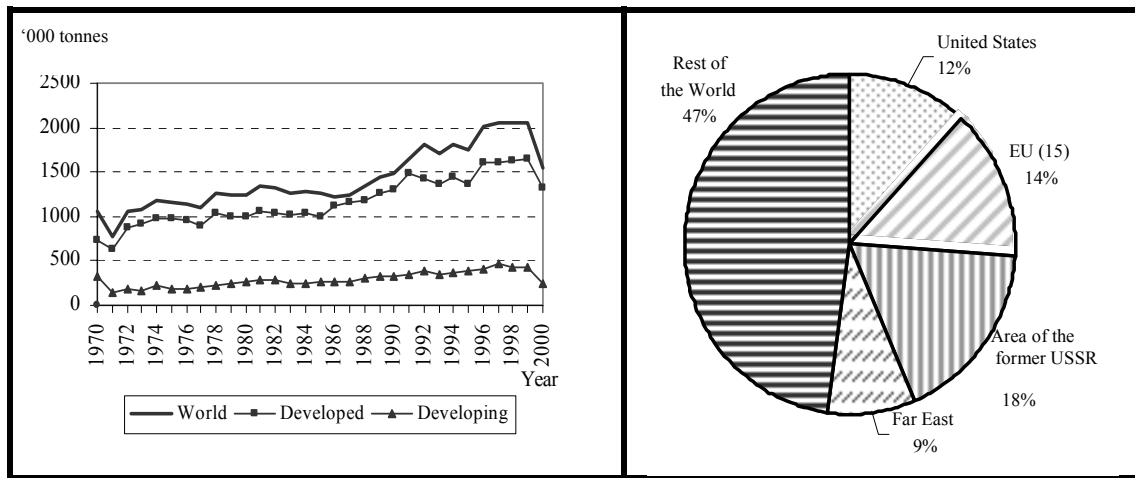
Developing countries imported about 0.21 million tonnes of tobacco leaf in 1970-72, while by 1999 imports had increased to 0.42 million tonnes (Figure 2.10).

The major importers among developing countries are the countries of the Near East and the Far East. In 1970-72. Near East imports totalled about 0.03 million tonnes and by 1999 had expanded to 0.12 million tonnes. Far East imports expanded from 0.09 million tonnes 1970-72, to 0.18 million tonnes in 1999.

The growth rate for tobacco exports from developed countries averaged about 0.4 percent annually during the period 1970 to 1999. Shares of major exporters are shown in Figure 2.9.

The weighted average of export unit value of tobacco of the six major exporters increased rapidly to the mid-1980s and has fluctuated around a stable trend since then. (see Figure 2.11).

Figure 2.11 World price and export values

(a) World price ($/tonne)
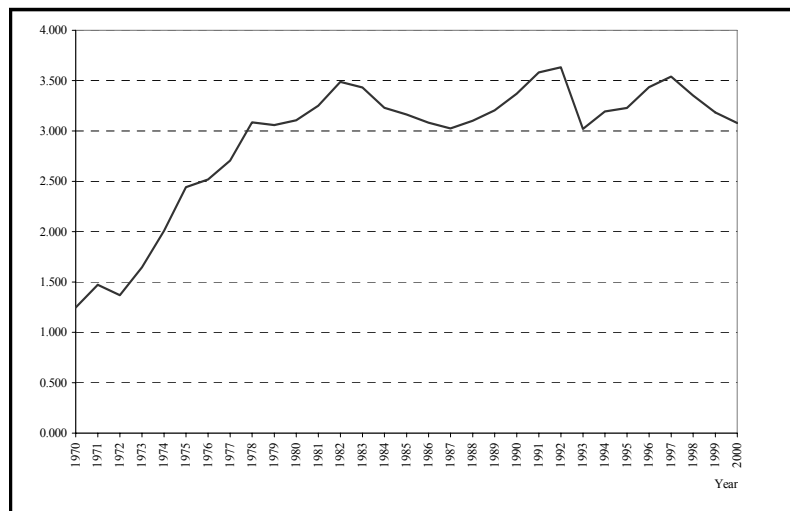
(b) Export unit value ($/tonne) (1990, 2000)
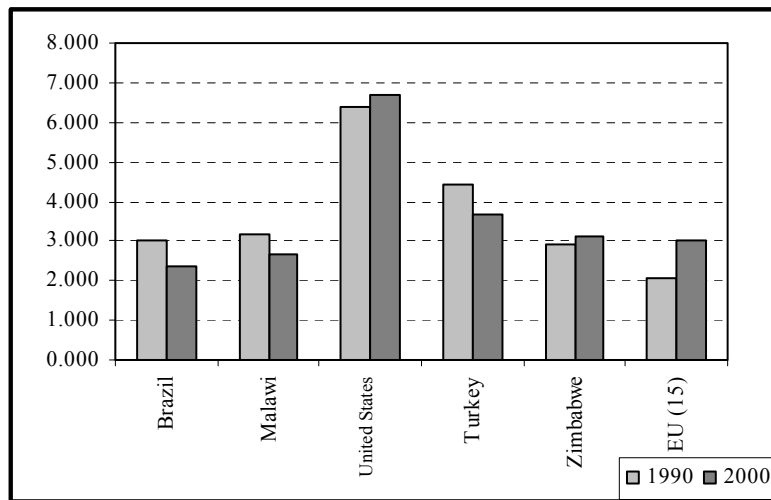
2.4.2   Exports and imports of cigarettes

The world experienced an increase in cigarette exports during the period 1970 to 1999 (see Figure 2.12). In 1970-72, exports of cigarettes averaged 0.16 million tonnes, and by 1999 they had increased to 0.94 million tonnes. (see Table A.3.4). Developed countries are the major exporters with European Union having the biggest share. Cigarette exports from the EU increased from 0.04 million tonnes in 1970-72 to 0.37 million tonnes in 1999. Among the EU member countries, the Netherlands is the major cigarette exporter.

The developing countries' share in world exports has increased but it remains quite small. From about 0.02 million tonnes of cigarettes in 1970-72, developing country exports increased to 0.26 million tonnes in 1999 (Figure 2.12). The major exporting region among developing countries is the Far East. Along with traditional exporters such as the EU (Netherlands, Germany, United Kingdom) and the United States, Singapore has developed as a major cigarette exporter in the Far East, far in excess of domestic consumption, although it is not a producer of tobacco.

Figure 2.12 Cigarettes – export trends (1970-2000) and shares (1999)
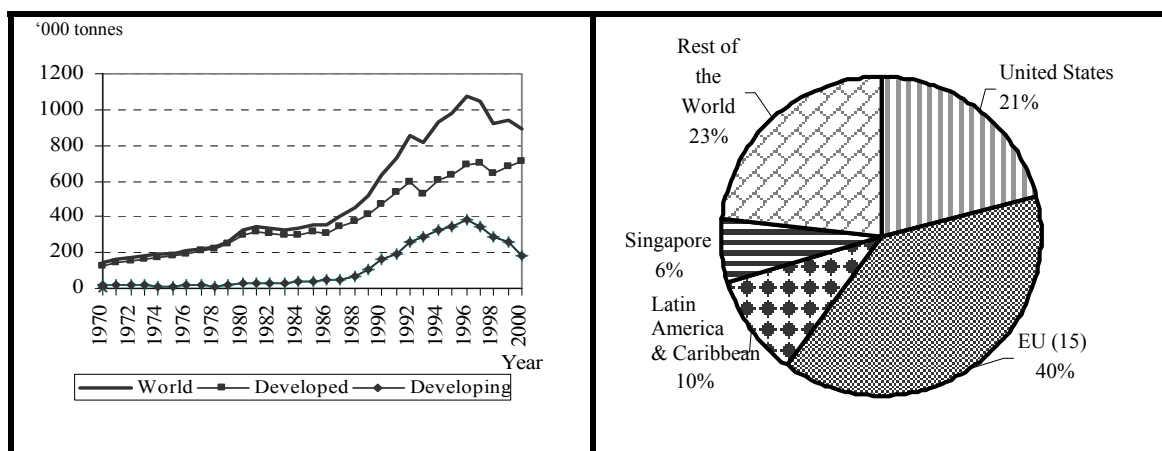
Developed countries are the major importers, with the EU and the area of the former USSR having the highest shares (Table A.4.3).

The developing countries increased their imports of cigarettes from 0.03 million tonnes in 1970-72 to 0.21 million tonnes in 1999 (Figure 2.13). The major importing developing region is the Far East. The EU, a major exporter, is also a major importer of cigarettes along with the area of the former USSR and Japan. The United States is an importer of small quantities.

Figure 2.13 Cigarettes – import trends (1970-2000) and shares (1999)
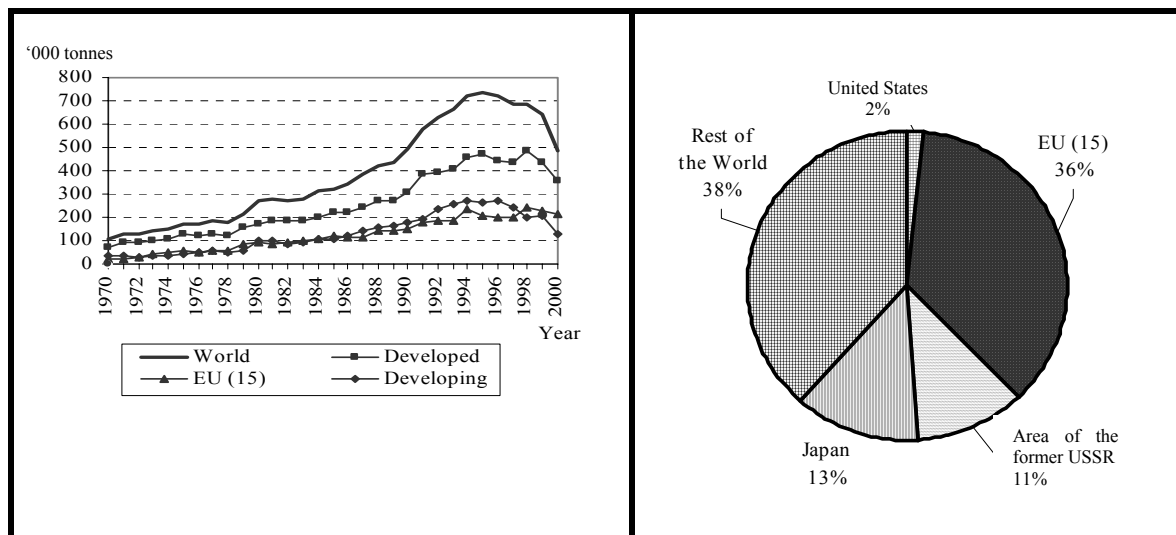
2.4.3   Trade in cigars and other tobacco products

Other tobacco products include cigars and smokeless non-manufactured products. World exports of cigars increased slowly during the period 1970 to 1998 from 0.01 million tonnes in 1970-72 to 0.03 million tonnes in 1998. In developed countries there were some wide fluctuations during the period. The major exporter among the developed countries is the EU, while the United States exports small quantities of cigars. After the period of 1990-92 exports of cigars contracted radically. Latin America and the Caribbean is the main exporting region among developing countries.

The major importers of cigars are the EU and the United States.

Global exports of other tobacco products increased significantly from 55 000 tonnes in 1970 to 330 000 tonnes in 1998. (Table A.3.6). The major exporters among developed countries are the EU and the United States. The Far East region is the main developing exporting region, with exports having increased from 3 000 tonnes in 1970 to 4 000 tonnes in 1998.

World exports of other tobacco products increased at about 6.7 percent per annum between 1970 and 1998. In developed countries exports increased at about 6.2 percent annually. In the EU, they increased by 6 percent annually and in developing countries by 10.7 percent annually.

World imports of other tobacco products increased from 22 000 tonnes in 1970 to 233 000 tonnes in 1998 (Table A.4.5), concentrated in the developed countries where imports increased from about 19 000 tonnes in 1970 to 158 000 tonnes in 1998. The major importer among developed countries is the European Union, while United States imports remained stable at about 3 000 to 4 000 tonnes. In developing countries the main importing region is the Near East.

3   PROJECTIONS TO 2005 AND 2010

The objective of this chapter is to provide a forward picture for tobacco to the year 2010 based on consistent projections of consumption, production and trade patterns for tobacco leaf for all countries and for the world.

The methodology used in the projections follows the structure of a standard commodity production, consumption and trade model, albeit with some simplifications imposed mainly due to lack of price data, detailed in Annex B.

The projections take into account changing consumer demand, production trends and likely developments in national and international policy relating to tobacco production, consumption and trade with particular attention given to the likely impact of the Framework Convention on Tobacco Control.

Alternative policy scenarios incorporating various price and non-price policy measures - including raising taxes, reducing protection to tobacco production and the adoption of bans on advertising and promotion of cigarettes in various countries - are incorporated when possible.

3.1   METHODOLOGICAL FRAMEWORK

3.1.1   The methodological approach

The methodology essentially includes three stages. In the first stage production, demand, export and import equations were estimated for the major producing countries (China, India, Brazil, the United States, the EU, Turkey, Zimbabwe and Malawi) and also for groups of countries (other Europe, area of the former USSR, Oceania, other developed, other Africa, other Latin America, other Near East and other Far East). The specification and the estimation results using data for the period 1970 to 1998 are provided in Annex B.

In the second stage the model consisting of five equations (demand, area, yield, exports and imports) was calibrated to the base year (1998, i.e. the three-year average 1997-1999) by adjusting the intercept. The year chosen as the base year, 1998, is in fact the three-year average 1997-1999.

The model was validated by examining out-of-sample predictive ability (1992 to 1997). The validation results show that variability at the country level was high and predictive ability at the country level was rather poor but adequate. This implies that projections at the country level may not be good enough to capture all country details and particularities. However, at the regional level (such as Africa, Latin America and the Caribbean, etc.) or at the world level the predictive ability is very good because projection inaccuracies at the country level are averaged out. This does not invalidate country level projections, but it implies that such projections cannot be used for country level work. They serve a completely different purpose and as such have shortcomings which in order to make them useful at the country level need additional work to provide greater detail at the modelling stage and incorporation of qualitative information.

In the third stage, projections were obtained for each country of the standard country list, using the model. The projection results were examined at the country level to conform with a priori knowledge about developments in each country concerning production policies, consumption trends and trade flow developments. Some adjustments in certain parameters were necessary to achieve consistency of projection results. The consistency of the projection results was examined mainly by comparing the net trade position projected by supply and demand for main producing and trading countries with the results of the independently projected exports and imports.

In addition, results were examined for consistency with a priori knowledge about the various countries and their production, consumption and trade conditions. Such country knowledge was incorporated

into the projection results for countries for which country level studies were available, such as China, Turkey, India, Zimbabwe, Malawi, and also for the EU and the United States for which some general information is available from other sources.

3.1.2   Data and definitions

The data used for the projections in this study have been derived from various sources, including FAO, USDA, the World Bank and various other sources.

The study covers all major countries of the world, although some minor ones are left out. The standard country list, given in Annex A, used for the study includes 164 countries grouped into Developed and Developing countries, grouped further into regional groups, the same as those used in the analysis of past trends in Chapter 2. China is in some cases singled out because of its size.

Production data include tobacco leaf production in farm weight, as well as the area under tobacco in hectares and yield in farm weight for all countries of the world for the period 1970 to 2000. There are also detailed data by type of tobacco, such as Virginia, Burley, etc. Consumption data are in dry weight for all countries of the standard country list. Similarly, there are export and import data (quantity and value) in dry weight for each country in the country list for the period 1970 to 1999. Consumption and trade data are aggregate data, and thus no distinction is possible of the various tobacco types. Tobacco leaf consumption data at the country level are derived using a supply utilization account and data on stocks, production, imports and exports. Consumption data do not include 'on farm' consumption of home produced tobacco, which is believed to account for a substantial part of consumption in many developing countries.

Cigarette production and consumption data exist for a number of countries, but they are incomplete. Therefore the analysis did not include cigarette demand and supply, but consumption of all tobacco products is translated into leaf equivalent. Thus, the analysis includes only one level (tobacco leaf).

Price data are very scarce. There are several reasons for this deficiency. First, tobacco is a differentiated commodity with various tobacco types produced and traded. Countries and manufacturers buy particular types that they need to produce the desired blend for the types of cigarettes they produce and therefore they may appear as both importers and exporters. Therefore, a price corresponds to a particular tobacco type, and prices of different tobacco types differ widely. Thus, there is no homogenous commodity called tobacco but various tobacco types traded internationally at prices that differ substantially. Furthermore, there are substantial quality differences within each tobacco type reflecting substantial differences in quality. In addition, some leaf producing countries such as in Brazil, manufacturers purchase by direct contract so price data are not available. Producers in countries such as Zimbabwe and Malawi sell in auction markets and there is good price data for these countries. For Turkey also there are good price data maintained by the national tobacco monopoly. For the United States and the EU price data were obtained from other sources. For other countries, however, no price data are available for either production or consumption.

3.1.3   Factors affecting demand

The main factors that determine the growth in consumption over the 1970 to 1998 period are population and income growth, urbanization and changing tastes. Among them population growth is perhaps the most important determinant of growth in tobacco consumption.

Population

World population for the period 1970 to 2010, actual and projected, is shown in Table 3.1. Population has increased during the period 1970 to 2000 at about 2 percent annually, with developed country population increasing at about 0.6 percent per year and developing country population increasing at about 2.2 percent per year. This divergence in population growth between developed and developing

countries is projected to continue to the year 2010 increasing further the share of developing country population from 79 percent in 1998 to 81.5 percent in 2010.

Table 3.1 Population growth

	Actual				Projections	
	1970-72	**1980-82**	**1990-92**	**1997-99**	**2005**	**2010**
	million people					
World	**3 922.7**	**4 714.3**	**5 606.5**	**6 203.9**	**6 779.5**	**7 179.0**
Developed	**1 087.4**	**1 177.1**	**1 259.6**	**1 297.6**	**1 322.7**	**1 336.4**
North America	233.8	257.5	284.8	304.6	320.9	331.9
United States	212.1	232.6	256.7	274.0	288.4	298.0
Europe	461.4	484.3	500.1	507.5	509.8	508.8
EU (15)	*342.4*	*356.1*	*366.7*	*374.3*	*376.5*	*375.7*
Other Europe	*118.9*	*128.1*	*133.5*	*133.2*	*133.3*	*133.1*
Area of the former USSR	245.1	267.7	290.6	291.7	292.1	293.8
Oceania	15.7	17.9	20.5	22.3	23.8	24.8
Other developed	131.4	149.8	163.5	171.6	176.0	177.0
Japan	105.7	117.7	124.0	126.3	127.5	127.3
Developing	**2 835.4**	**3 537.2**	**4 346.9**	**4 906.3**	**5 456.8**	**5 842.6**
Africa	284.6	375.5	498.0	596.2	704.3	789.8
Malawi	4.6	6.4	9.5	10.4	12.3	13.9
Zimbabwe	5.4	7.4	10.1	11.4	12.2	12.9
Latin America	290.2	367.3	446.1	501.0	554.9	592.1
Argentina	24.4	28.5	33.0	36.1	39.3	41.5
Brazil	98.4	124.4	150.3	165.8	180.6	190.9
Near East	336.5	440.3	577.6	678.6	785.2	862.8
Turkey	36.3	45.5	57.2	64.5	71.5	76.1
Far East	1 924.1	2 354.1	2 825.2	3 130.5	3 412.4	3 597.9
China, Mainland	836.5	994.5	1 149.2	1 233.8	1 303.4	1 349.1
India	567.8	704.0	867.5	982.2	1 087.5	1 152.2
Indonesia	123.3	154.2	185.8	206.3	225.5	238.0

Source: World Bank

Tobacco, however, is consumed largely by the adult population (usually 15 years and over). Thus, it is important to take into account not only the total population, but also the adult population.[1]

Adult population (15 years and over) as a percentage of total population is increasing rapidly in developing countries, thus increasing the number of potential tobacco consumers in the population. (see Table 3.2).

The adult population increased from 4.3 billion in 1998 to 5.2 billion in 2010. With 1.1 million smokers (one in four) in 1998 (World Bank), if smoking rates continue the number of smokers may reach 1.32 billion in 2010, about 20 percent more than in 1998, or an increase of about 1.5 percent annually. Hence, an increase in tobacco demand may be expected simply as a result of the increase in the number of smokers world-wide with present smoking rates, as a result of population growth.

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[1] Although tobacco products are consumed by adult population, consumption parameters can be estimated using total population figures (adult population data were available only for certain years), as is shown in the methodological Annex. The estimated parameters reflect possible changes in population structure, changes in consumption patterns, etc and accurately predict demand trends.

Table 3.2 Adult Population (15 years and over) as percentage of total population

	Actual				Projected	
	1975	1985	1995	2000	2005	2010
	percent					
World	**0.63**	**0.67**	**0.69**	**0.70**	**0.72**	**0.73**
Developed	**0.75**	**0.77**	**0.78**	**0.80**	**0.81**	**0.83**
United States	0.75	0.78	0.78	0.78	0.79	0.80
Europe	0.77	0.80	0.81	0.82	0.83	0.84
EU	0.77	0.81	0.82	0.82	0.83	0.84
Other developed	0.72	0.74	0.79	0.80	0.81	0.81
Japan	0.76	0.78	0.84	0.85	0.86	0.86
Developing	**0.59**	**0.64**	**0.66**	**0.68**	**0.70**	**0.72**
Africa	0.54	0.54	0.56	0.57	0.58	0.59
Malawi	0.53	0.53	0.53	0.54	0.54	0.55
Zimbabwe	0.52	0.53	0.54	0.55	0.56	0.58
Latin America	0.59	0.62	0.67	0.69	0.71	0.73
Brazil	0.60	0.63	0.68	0.71	0.73	0.75
Near East	0.57	0.59	0.61	0.64	0.66	0.68
Turkey	0.60	0.64	0.68	0.70	0.71	0.74
Far East	0.60	0.65	0.68	0.70	0.72	0.74
China	0.61	0.70	0.74	0.75	0.78	0.78
India	0.60	0.62	0.65	0.67	0.69	0.70
Indonesia	0.59	0.62	0.67	0.69	0.72	0.74

Source: World Bank

Income

The second most important factor determining tobacco consumption is income growth. World income (GDP) increased during the period 1970 to 2000 at slightly over 3 percent. In developed countries incomes increased by about 2.5 percent annually while in developing countries income growth was about 4 percent. In China it was about 8 percent annually. Similar trends are expected to continue in the period 1998 to 2010 with a total GDP increase of 41 percent in developed countries, 127 percent in China, and 70 percent for the other developing countries, corresponding to average annual GDP growth rates of 3.1 percent, 7.7 percent, and 4.9 percent respectively.

Estimates of income elasticities are available in the literature for several countries. Evidence shows that estimated income elasticities are much higher in developing countries than in developed countries. The literature suggests that income elasticities for tobacco products are about 0.5 for developing countries and about 0.2 for developed countries (see Zhang, 2000). Thus, income growth may have, other things being equal, a potentially strong positive impact on tobacco demand that amounts to an average annual growth rate of 0.6 percent in developed countries, 3.8 percent in China and 2.4 percent in other developing countries.

The combined effect of population and income growth on tobacco demand may reach 1.4 percent in developed countries, 4.6 percent in China and 4.2 percent in other developing countries. However, due to other factors such as prices, taxation, and health awareness, such high rates will not probably materialize as actual consumption, as it was the case in the period 1970 to 1998. During this period the actual observed growth rate of tobacco consumption was much lower than the combined population and income effect. [1]

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[1] One of the reasons is that income elasticities are estimated mostly with time series data and as such are short term elasticities, thus much higher than long term elasticities. Long term demand projections may need such long term elasticities from cross section data or household budget survey data.

Table 3.3 GDP growth

	Actual			**Projected:**		
	1970-72	**1980-82**	**1990-92**	**1997-99**	**2005**	**2010**
	US$ billion, 1987					
World	**9 925.6**	**13 612.4**	**18 371.2**	**27 689.2**	**27 689.2**	**32 869.6**
Developed	**8 568.8**	**11 451.1**	**15 197.5**	**17 497.8**	**21 407.6**	**24 776.0**
North America	*3 254.4*	*4 161.2*	*5 543.5*	*6 857.0*	*8 741.2*	*10 185.1*
United States	3 029.3	3 824.4	5 098.4	6 329.8	8 078.6	9 420.0
Europe	*3 562.5*	*4 660.6*	*5 861.4*	*6 631.6*	*8 076.9*	*9 375.4*
EU (15)	3 193.3	4 145.4	5 295.1	6 022.2	7 329.9	8 489.2
Other Europe	*369.2*	*515.2*	*566.3*	*609.4*	*747.0*	*886.2*
Area of the former USSR	*208.1*	*345.9*	*488.2*	*336.2*	*417.5*	*494.6*
Oceania	*152.9*	*200.5*	*262.6*	*341.2*	*438.6*	*521.1*
Other Developed	*1 391.0*	*2 082.9*	*3 041.8*	*3 331.8*	*3 733.4*	*4 199.9*
Japan	19.2	30.9	41.8	58.6	3 539.9	3 966.1
Developing	**1 356.8**	**2 161.3**	**3 173.7**	**4 499.1**	**6 281.6**	**8 093.6**
Africa	*139.4*	*201.5*	*255.6*	*305.6*	*399.7*	*488.6*
Malawi	0.7	1.0	1.3	1.9	2.4	2.8
Zimbabwe	4.3	5.9	8.3	9.6	11.8	13.6
Latin America	*441.4*	*716.2*	*841.9*	*1 063.0*	*1 377.5*	*1 707.3*
Argentina	88.4	107.1	110.1	152.8	187.7	230.6
Brazil	123.9	241.9	288.9	353.8	458.1	570.9
Near East	*340.8*	*481.0*	*560.2*	*699.0*	*893.6*	*1 075.9*
Turkey	42.2	61.3	99.9	131.3	173.3	221.1
Far East	*435.2*	*762.7*	*1 516.0*	*2 431.5*	*3 610.8*	*4 821.8*
China, Mainland	80.2	143.0	360.6	744.0	1 207.2	1 693.1
India	145.1	205.2	351.3	535.6	793.5	1 037.1
Indonesia	26.6	54.6	103.9	143.4	179.2	228.1

Source: World Bank

Prices and other factors

Price is obviously a very important factor determining demand for tobacco products. Cigarette demand is generally price inelastic. According to evidence available in the literature (see Zhang, 2000), in developed countries price elasticities of cigarette demand range from –0.2 to –0.4, while in developing countries price elasticities range from –0.6 to –0.9.

The price of tobacco at retail level includes a substantial amount of excise taxes, and thus the leaf value content of the final consumption product is quite low. The evidence available on demand elasticities for cigarettes implies that demand for cigarettes in developed countries is less responsive to taxes than in developing countries. As a result, any future changes in tobacco tax policies in developing countries that would result in significant increase of the retail price level may have a strong negative impact on cigarette demand.

Another factor affecting cigarette demand is urbanization. Other things being equal, consumption of tobacco products is higher among urban dwellers than among rural dwellers. With increasing urbanization expected in the period to 2010 in developing countries, consumption of tobacco products is expected to increase further, in addition to the effects of population and income growth.

Growing awareness of the health risks that are associated with tobacco use induces many consumers to quit tobacco consumption, in particular in developed countries. This changes consumer preferences and introduces a negative time trend in tobacco consumption.

Available evidence shows that demand for cigarettes in developed countries responds strongly to direct measures such as counter-advertising, banning of advertising and smoking restrictions. In developing countries, such measures may have a rather lower impact on cigarette demand.

Overall, it seems much harder to curtail tobacco demand in developing countries because of the strong impact of population and income growth. From surveying the available literature it appears that taxation may have a strong impact on cigarette demand and thus it becomes an effective measure to use in developing countries in parallel with other direct measures such as counter-advertising, banning of cigarette advertising and smoking restrictions.

Finally, as the objective of this effort is to estimate demand for tobacco leaf, trends in the use of tobacco leaf in cigarette manufacturing must be considered. Past trends show that the use of tobacco leaf per cigarette stick in cigarette manufacturing has been reduced by as much as 15 percent over the past 30 years, thus reducing the actual use of tobacco leaf in the final product. This reduction is due to the use of filter tips and new technologies which reduce waste and pack less tobacco into cigarette sticks. This is more pronounced in countries catching up in technology in cigarette manufacturing, such as China.

3.1.4   Price and non-price factors in projecting supply

Tobacco supply is determined by area cultivated under tobacco times yield obtained per unit of area. Average world yields increased from about 1.3 to 1.7 tonnes/ha in farm weight during the period 1970 to 2000 or an average annual growth rate of about 0.9 percent. Area under tobacco increased steadily from 1970 to 1990 but it shows a strong variability over the past decade, mainly due to China.

Production conditions

Production conditions differ significantly across producing countries, reflecting the production of different tobacco types and differences in comparative advantage of tobacco production of a specific type. It should be stressed that it is difficult or sometimes impossible for a country to change from the production of one type of tobacco to another, either in the short term or in the long term. It is not only that natural conditions differ from country to country, but also fixed capital produced has no use when production is switched to a different type and production knowledge becomes obsolete.

Thus, the factors used in tobacco production are usually product or type specific and cannot be easily switched between types. Hence, although aggregate supplies may appear to be in balance, prices of particular types of tobacco may exhibit different trends because of shortages or surpluses of certain tobacco types or grades within a certain tobacco type. In particular, high-quality grades used in making high quality cigarettes are usually in short supply and are high priced, whereas other grades are plentiful and low priced.

In addition, in the manufacturing of cigarettes, individual brands contain a mixture of tobacco types producing certain taste and consumption characteristics. Any changes in the mixture are implemented over long periods of time. Thus, substitution between types is limited and it is possible only between certain types.

Producer prices

Producer prices are influenced by price and trade policies implemented at country level either for tobacco production or for commodities competing with tobacco for the same resources. Although price support schemes in the developed countries have an impact on world market supplies, the profitability of tobacco as a cash crop in most developing countries is several times higher than that of any other competing commodity. There are also some countries, such as Brazil, China, Zimbabwe and Malawi, where tobacco production does not receive any government support, implying that they have comparative advantage at world level.

Price is the most important factor in determining the supply of tobacco leaf, through its influence mainly on the area harvested. The impact of price levels on yields is generally much smaller and for all practical purposes can be ignored since yields are usually determined by technological and physical

factors. Area harvested is determined mainly by past land use levels, price levels and trend factors (partial adjustment).

Application of this well-known partial adjustment methodological framework, however, is difficult for tobacco, in particular at world level, because of lack of price data. Tobacco is a differentiated product and there are many prices corresponding to different product types. Finally, quality is an important factor in determining prices, resulting in substantial price differences between different types and within each type. Quality varies considerably between types and within each type, as do buyers' requirements for quality and type.

Changing support policies

Recent trends in price support policies towards reducing support levels may decrease production in developed countries.

The pressure against policies supporting tobacco production in the developed countries indicates that sooner or later these support policies will weaken, if not be eliminated, thus increasing further the possibility of shifting tobacco production to the developing countries.

Tobacco production in some developing countries, such as India and Turkey, receives direct price support or indirect input subsidies. However, even if such subsidies were to be removed, tobacco profitability would not be challenged in comparison with alternative cash crops. Thus, even in countries where such subsidies are used, production might be expected to continue to increase, even if these subsidies are partly removed.

In China, tobacco may not be more profitable than other crops but it offers farmers lower risk and uncertainty, since production is based on contracts. Thus, given the institutional framework of tobacco production and use in China, production is expected to follow trends in demand. In other developing countries, such as Brazil, Zimbabwe and Malawi, where tobacco is produced without any government support and is competitive internationally, production is expected to take over the gap in world supplies that will occur from the decline in production in the developed countries.

3.1.5   Determinants of exports and imports

Trade flows are determined by trends in demand and supply in trading countries and regions of the world, and also by trade distortions introduced by exporters or importers, such as tariffs and non-tariff barriers, export promotion and domestic policy.

The best approach for projecting trade flows at world level is to use a world commodity model, where producing and consuming regions interact in the world market and determine export and import flows and a world price. As noted above, this first best option is not available in the present study for several reasons. First, tobacco is a differentiated commodity and various tobacco types have substantially varying prices in the international market. Second, for the same reason, many countries find themselves to be both importers and exporters of different tobacco types. Third, the lack of adequate price data does not allow the construction of a full commodity model that would allow an accurate forecast of various commodity flows.

Given the above limitations, there are two alternative options that can be utilized. First, since we have available independent projections of demand and production, we can derive from them projections for net trade flow requirements (net import requirements or net export availabilities) for each country. Alternatively, we can estimate export and import functions, as we did for production and demand, and project for each country in the standard country list independent export and import flows. A first test of the reliability of these estimates could be used to examine whether projected trade flows generally conform with the net trade position implied by the independent supply and demand projections.

In this study we implemented the second option and estimated export and import functions for major producing and consuming countries and regions. Export and import function specifications and estimation results are given in detail in Annex B. Export and import flows depend on self sufficiency ratios (production to consumption) and relative prices (domestic to world market prices), as well as the lagged dependant variables.

3.1.6   Policy scenarios

The projections take into account changing consumer demand, production trends and likely developments in national and international policy relating to tobacco production, consumption and trade with particular attention given to the likely impact of the Framework Convention on Tobacco Control.

Two alternative policy scenarios were developed for the analysis of projection results, incorporating various price and non-price policy measures including raising taxes, reducing protection to tobacco production and the adoption of bans on advertising and promotion of cigarettes in various countries.

The **baseline scenario** assumes continuation of present policies. It assumes that real consumer and producer prices will remain at base year (i.e. 1998) levels throughout the projection horizon 1998 to 2010.

In projecting tobacco leaf demand, the baseline scenario assumes there would be no change in policies and a continuation of present price, tax and other smoking restriction policies. Countries have already introduced smoking restrictions and a slow-down or even decline in certain cases has been observed in cigarette consumption during the 1990s. However, actual data for 2000 that have recently become available indicate that in some countries, such as China, part of this decline in the 1990s may be a cyclical short term trend associated with changes in stocks and some growth in tobacco demand should be expected during the period 1998 to 2010.

In projecting tobacco leaf supply some assumptions were made to capture changes in the level of production support in the various countries. In the baseline scenario a continuation of present policies is assumed, thus maintaining the present level of production support. However, it is unlikely that such support policies will be fully maintained during the period to 2010 and some decline in production support should normally be expected. Several, mainly developed, countries have already introduced policies restricting production and a slow down or even decline in certain cases has been observed in tobacco leaf production during the 1990s.

The **policy scenario** assumes the adoption of strong policy measures against tobacco consumption and production that includes increasing taxation on consumption and reducing production support. As a result of such measures, it is assumed that consumer prices increase by 30 percent and production support is reduced by 40 percent in the developed countries and by 20 percent in the developing countries.

The policy scenario aims to capture the impact on demand of a strong anti-smoking policy, similar to the one introduced in most developed countries, mainly in the United States. This scenario assumes a strong increase in taxation in all developing countries, including China, resulting in an increase in tobacco price of 30 percent. In addition some stronger measures of smoking control are assumed, resulting in a relatively modest negative time trend. For the United States no change was introduced with the policy scenario and the results of the baseline and the policy scenarios are the same.

In projecting tobacco leaf supply the policy scenario aims to capture the possible impact of a reduction in the level of support in both developed and developing countries. We assume a strong anti-tobacco policy in the United States and the EU that would result in a 30 percent reduction in the tobacco price in 2005, remaining at that level to 2010. In addition, we assume a rather less strong anti-tobacco policy in developing countries that reduces the farm level price by 20 percent implemented in 2001 and

remaining at that level for the entire period to 2010. No change, however, is assumed for Brazil, Zimbabwe and Malawi, where tobacco production does not receive any government support. In some countries, such as India, the decline in price due to a reduction in government support was assumed to be 10 percent.

The price changes assumed in the policy scenario are introduced in one step in 2001, with real producer and consumer prices remaining at the same level throughout the period 2001 to 2010. This does not change the results for 2010 and shows the immediate impact of policy on demand, production and trade. The policy scenario aims to evaluate the relative impact of certain policy measures, such as consumption tax and producer price support, that are considered to have a strong impact on demand, production and trade.

The assumed increase of 30 percent in consumer prices in developing countries with an increase in taxation rates is substantial and, perhaps, difficult for governments to implement. Further, a reduction in producer support resulting in a decline in producer price by 40 and 20 percent respectively in developed and developing countries may be considered quite realistic. It is realistic to expect an elimination of producer subsidies in the EU within 4 to 8 years and there is increasing pressure in the United States for elimination of the tobacco programme.

Projections of trade flows to 2010 for the baseline and policy scenarios were obtained by introducing projected production and consumption figures in the baseline and policy scenarios respectively and assuming continuation of present trade policies with respect to trade distortions by tariff and non-tariff barriers, and export promotion policies.

Finally, the projection results were compared with the net trade position implied by the supply and demand projections. Adjustments were made using judgement and discretion and some a priori knowledge about the countries so that the two approaches produce similar results.

3.1.7   Caveats and limitations

Modelling in such a detail at world level and for all countries of the world would have been an enormous task extending far beyond the limits of this exercise. Instead, the study followed a pragmatic approach, by constructing a commodity model, using several shortcuts to make up for limitations due to lack of data. Incorporation of qualitative information was implemented sometimes at the expense of modelling purity. The focus was to produce meaningful results useful for guiding policy makers.

A substantial amount of information results not from reading the projection numbers *per se*, but from the changes that result from changing assumptions and from introducing policy measures. Again, it is not the level of the projected variables that matters but the relative percentage change. Thus, it can be said that the projection numbers presented in this study reflect not only the outcome and the simulation results of the quantitative model, but also the results of substantial qualitative information available through country level studies.

3.2   PROJECTIONS OF DEMAND

World demand for tobacco in the baseline scenario is expected to increase to 7.1 million tonnes in dry weight in 2010, reflecting two divergent trends. In developed countries overall demand is declining slightly and it is expected to be about 2.05 million tonnes in 2010, or about 10 percent lower than in 1998 (2.23 million tonnes). The decline is weaker in Europe than in North America and Oceania. However, total tobacco consumption in the developed countries in 2010 is likely to represent only 29 percent of world tobacco demand (down from 34 percent in 1998), the remaining 71 percent being consumed in the developing countries. Thus, the world picture of tobacco demand in the future is determined mainly by the developing countries.

Tobacco consumption in developing countries is expected to increase to 5.09 million tonnes in dry weight, up from 4.2 million tonnes in 1997-1999. This represents an average annual growth rate of 1.7 percent between 1998 and 2010, significantly lower than the 2.8 percent observed in the period 1971 to 1998. About 80 percent of the projected increase in demand is in the Far East and in particular in China. The share of China in total world tobacco demand is projected to increase in 2010 to 43 percent, up from 38 percent in 1991.

3.2.1   Overall demand projections

World tobacco demand in dry weight is projected to reach 7.1 million tonnes in 2010 in the baseline scenario and 6.4 million tonnes under the policy scenario (see Figure 3.1 and Table 3.4).

The decline in consumption during the 1990s should be considered with caution because the second half of the 1990s shows an unusual volatility. China, for example, shows a high volatility in production and consumption (see Figure 3.1). Also the years 1998 and 1999 show an unusually strong decline in consumption which may be related to changes in stocks.

Figure 3.1 Tobacco leaf – consumption trends, 1970-2010
(baseline scenario) (dry weight)
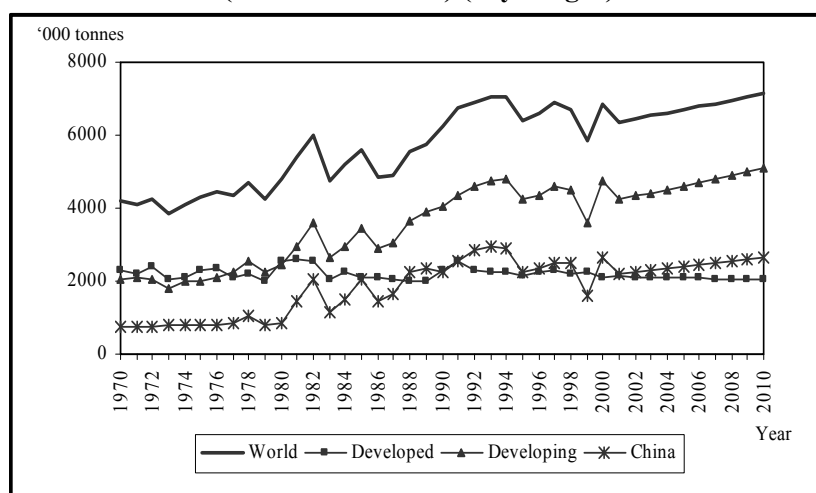
Although one would accept production volatility as normal, such volatility is rather unusual in consumption given that tobacco use is habit related. If one examines world-without-China consumption figures, the observed pattern of consumption increases steadily from 4.1 million tonnes in 1991 to 4.3 million tonnes in 1998 and to 4.5 million tonnes in 2010. The projected pattern of tobacco consumption is given in Figure 3.1 and the expected consumption shares in 2010 in Figure 3.2.

Figure 3.2 Tobacco leaf – consumption share, 2010
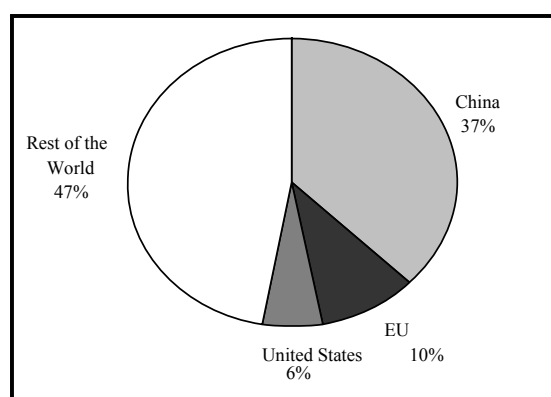
**Table 3.4 Tobacco consumption and demand projections
(scenarios – baseline and policy)**

	Actual				Projected			
					Baseline		Policy	
	1970-72	1980-82	1990-92	1997-99	2005	2010	2005	2010
World	**4 193.9**	**5 404.0**	**6 616.6**	**6 475.7**	**6 695.4**	**7 151.5**	**6 062.7**	**6 447.7**
Developed	**2 297.0**	**2 568.0**	**2 384.4**	**2 237.8**	**2 087.0**	**2 054.8**	**2 065.2**	**2 029.3**
North America	*712.6*	*774.6*	*699.6*	*701.6*	*538.9*	*475.9*	*538.9*	*475.9*
United States	646.1	706.2	657.9	651.3	493.3	433.8	493.3	433.8
Europe	*997.8*	*1 147.5*	*1 188.4*	*981*	*946.4*	*946.0*	*922.4*	*927.8*
EU (15)	715.4	811.4	905.9	730.7	696.4	690.6	690.0	690.4
Other Europe	*282.4*	*336.0*	*282.5*	*250.3*	*250.0*	*255.3*	*232.4*	*237.4*
Area of the former USSR	*319.3*	*362.9*	*248.2*	*311.3*	*383.3*	*442.3*	*349.9*	*403.8*
Oceania	*32.4*	*31.5*	*25.2*	*25.2*	*21.6*	*19.3*	*26.2*	*23.4*
Developing	**2 059.2**	**3 013.5**	**4 339.1**	**4 237.9**	**4 608.5**	**5 096.7**	**3 997.5**	**4 418.4**
Africa	*114.5*	*117.6*	*151.8*	*190.2*	*257.3*	*290.6*	*234.2*	*264.4*
Latin America	*340.5*	*429.5*	*375*	*457.4*	*473.6*	*530.7*	*412.9*	*462.2*
Brazil	120.5	218.8	200.6	229.4	234.4	257.9	210.5	231.6
Near East	*130.4*	*218.4*	*242.8*	*265.5*	*271.5*	*306.8*	*242.2*	*273.7*
Turkey	59.5	108.5	134.7	126.1	126.2	140.9	112.5	125.6
Far East	*1 472.4*	*2 247.0*	*3 567.8*	*3 324.7*	*3 606.1*	*3 968.6*	*3 108.2*	*3 418.1*
China	745.6	1 448.2	2 553.5	2 197.0	2 390.8	2 659.5	2 048.8	2 277.7
India	235.8	326.1	407.3	477.4	517.3	563.8	450.4	490.7
Indonesia	42.1	104.1	121.4	137.9	166.2	180.7	131.6	142.8

In developed countries tobacco consumption is declining and the developed country share in world tobacco consumption is projected to drop in 2010 to 29 percent from 35 percent in 1991. This is a major change in the structure of tobacco consumption at world level.

Among developing countries, China, the world's largest consumer, increased tobacco leaf consumption from 0.7 million tonnes in 1971 to 1.4 million tonnes in 1981, 2.5 million tonnes in 1991 and 2.2 million tonnes in 1998. The projected tobacco leaf consumption figures for China for 2005 and 2010 in the baseline scenario are 2.4 and 2.6 million tonnes respectively. Given the increase in population projected for the period to 2010, this projection assumes that both cigarette consumption per capita and the smoking rate are going down as a result of present restrictive policies for smoking.

Figure 3.3 Tobacco leaf demand, world, 1970-2010
(scenarios – baseline and policy) (dry weight)
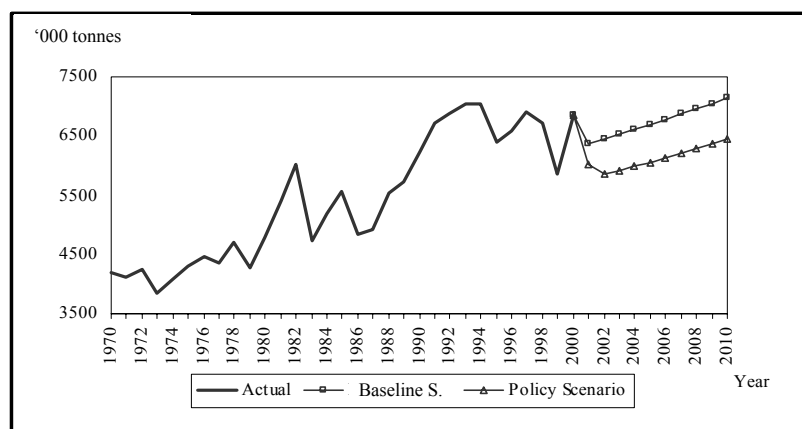
In the developing countries other than China consumption increased smoothly from 1.8 million tonnes in 1991 to 2 million tonnes in 1998, 2.2 million tonnes in 2005 and 2.4 million tonnes in 2010. Although tobacco consumption per capita is low compared to developed countries, consumption is projected to increase and the share of developing countries in global consumption is expected to rise from 31 percent in 1991 to 36 percent in 2010.

In the policy scenario, overall tobacco demand in the world is expected to be lower in 2010 by about 10 percent at about 6.5 million tonnes, as a result of strong anti-smoking policies, as shown in Figure 3.3. However, despite very strong measures such as an increase in taxation and strong smoking restrictions, the overall decline in tobacco leaf demand is still modest.

3.2.2   Developed countries

Detailed figures about actual consumption and projected demand for tobacco products are given in Table 3.4. The difference between the baseline and policy scenarios is rather small due to the fact that cigarette demand has a very low price elasticity and direct anti-smoking measures are already adopted. Demand is projected to decline from 2.3 million tonnes in 1998 to a little over 2 million tonnes in 2010 in both scenarios.

Figure 3.4 Tobacco leaf demand, developed countries, 1970-2010
(scenarios – baseline and policy) (dry weight)
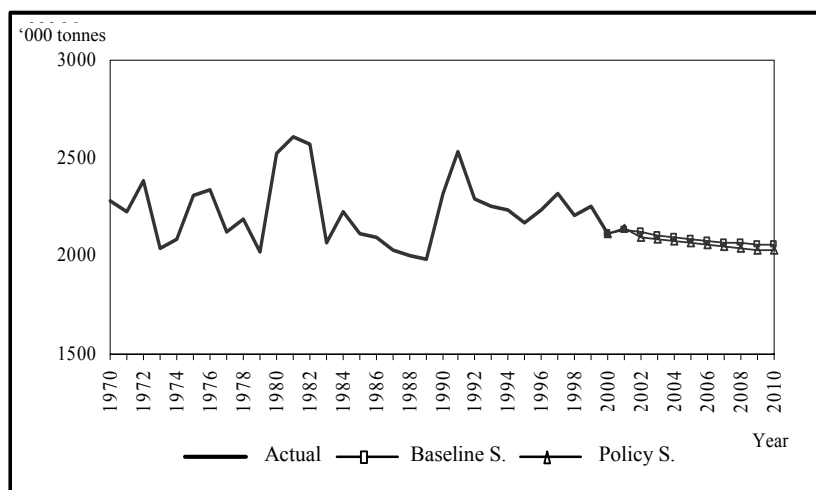
The major consuming countries or groups of countries are the United States and the EU. Tobacco demand in the United States is expected to continue to decline further. It is expected to decline in Europe also, but with some diversity between the EU and other countries. In the EU (15) demand is expected to decline following a strengthening of the anti-smoking campaign and an increase in cigarette taxation. In other countries of Europe, however, such as the transition economies of central and eastern Europe, demand is expected to increase due to a significant improvement in income. This is expected to happen also in the area of the former USSR.

In other developed countries, such as Japan, Israel, South Africa and Oceania, demand is expected to decline with trends similar to those observed in North America and the EU.

3.2.3   Developing countries

China

China's consumption of tobacco is higher than that of all other developing countries together. It is estimated that more than 320 million Chinese smoke, making China the largest cigarette consuming country in the world. Cigarette consumption in China jumped from 38 packs per capita per year in 1981 to 71 packs in 1990, but declined to 65.4 packs in 1999. Since incomes have been increasing during the 1990s, the observed decline in cigarette consumption may be attributed to other reasons such as health awareness or smoking restrictions.

Tobacco demand projections for the period to 2010 are shown in Figure 3.5. Demand is expected to increase but much more slowly than in the past and is expected to reach 2.6 or 2.2 million tonnes in 2010 in the baseline and the policy scenarios respectively. This level of demand is much lower than some years in the 1990s, as shown in Figure 3.5 and it implies a significant decline in consumption per adult and in smoking rates.

Figure 3.5 Tobacco leaf demand, China, 1970-2010
(scenarios - baseline and policy) (dry weight)
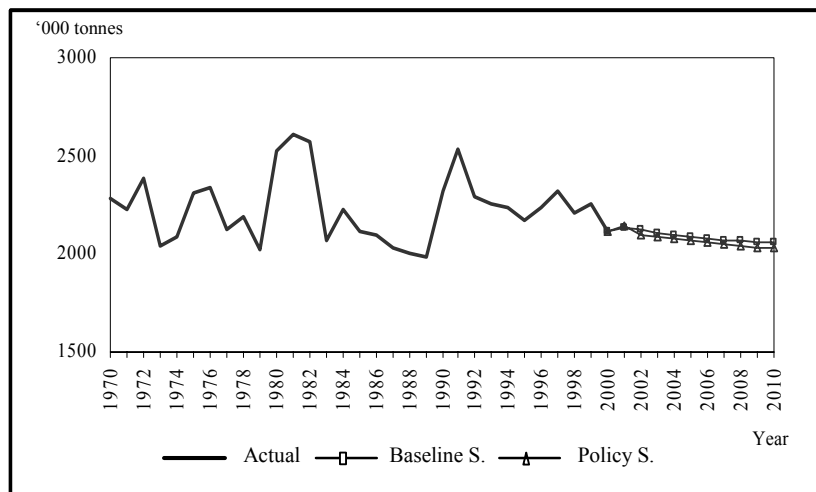
Furthermore, it is expected that some decline in tobacco leaf consumption may originate in the introduction of new technology in cigarette manufacturing that has already had a significant impact on demand for tobacco leaf and is expected to continue having a strong negative impact.

Overall, the prospects for the decade to 2010 are for slower growth of demand for tobacco leaf in China. The slower population growth and the increasing awareness of the health hazards of smoking may prevent significant growth in cigarette consumption. Furthermore, the improved technology in cigarette manufacturing may lead to further reduction in the use of tobacco leaf in cigarette production. Finally, consumption would also depend on whether or not the government were to take any effective measures towards smoking. Overall, total demand for tobacco in China is expected to grow but more slowly than in the past.

Other developing countries

The evolution of demand for tobacco in all other developing countries is shown in Figure 3.6. This group includes rest of Asia (excluding China), Africa, Latin America, and the Near East. Growth in tobacco consumption in these countries is expected to continue along past trends. Although a strong anti-smoking policy would certainly reduce demand, it would probably not reverse the positive trend. However, the overall impact of a strong policy is estimated to be a sizeable 16 percent.

The second most populous and also most important tobacco consumer is India. In India most consumption of tobacco is in the form of non-cigarette items, such as bidi, natu, chewing, hooka, etc. accounting for 75 percent of total consumption. Cigarette consumption accounts for only 25 percent. In spite of government efforts to curtail tobacco use, total apparent consumption of tobacco increased at a rate over 2.2 percent per annum during the last decade. Bidi recorded the highest rate, and the use of cigarette tobacco also grew, while non-smoking uses recorded a fall in consumption. The tax structure is also different. Bidi use is taxed lightly, while cigarette use, in particular filtered cigarettes, is taxed heavily.

Prospects for the decade to 2010 are for continuing growth in tobacco use in India. Population growth is expected to increase by 1.8 percent per annum. Urbanization will continue also, bringing urban population to above 30 percent in 2010 from 25 percent in 1991. Further, GDP is likely to grow at 5 to 6 percent per annum. Under present Government policies, the bidi sector will most likely continue to expand at its present rate of 2 percent per annum, and the cigarette sector will continue to expand at a higher rate of growth than in the last decade. Overall, total demand for tobacco is likely to continue to increase, but more slowly than in previous decades.

**Figure 3.6 Tobacco leaf demand, developing countries excluding China, 1970-2010
(scenarios - baseline and policy) (dry weight)**
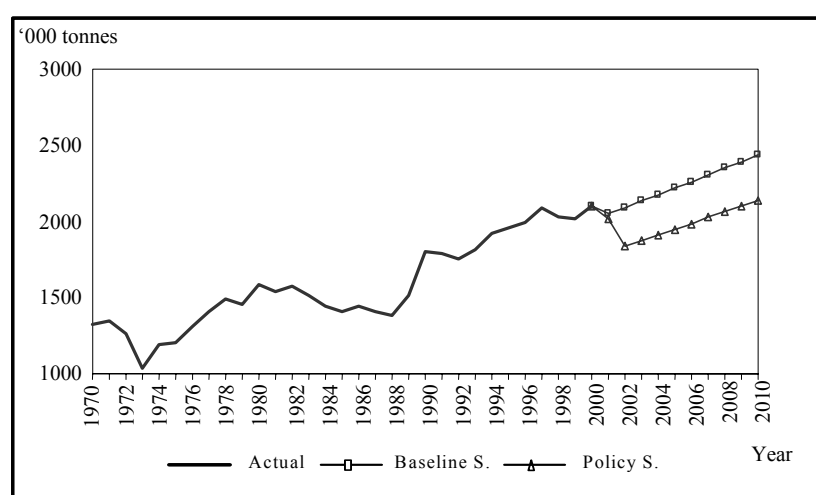
In Latin America, consumption of tobacco in 1998 was about 0.55 million tonnes, of which just over half was in Brazil, and most of the increase in the region's demand is expected to occur in that

country. Overall, demand in the countries of the region is expected to increase modestly during the period to 2010.

In Africa, total demand for tobacco increased in the 1990s with record growth of 3.5 percent per annum, much faster than in the 1970s and 1980s, due mainly to the increasing population. Growth for the period to 2010 is expected to continue at a similar rate.

In the Near East, demand for tobacco is expected to grow at rates a little lower than those experienced in the 1980s and 1990s. In Turkey, which is the main market in the region, consumption increased rapidly in the 1970s and 1980s and declined a little in the 1990s (see Table 3.4). The growth of consumption is expected to continue in the period to 2010, but at a lower annual growth rate than in the 1970s, 1980s and 1990s.

3.3   PROJECTIONS OF PRODUCTION OF TOBACCO LEAF

About 100 countries produce tobacco, but the major producers are China, India, Brazil, the United States, Turkey, Zimbabwe and Malawi, which together produce over 80 percent of the worlds' tobacco. China alone accounts for over 35 percent of world production, and thus variability of production in China directly affects variability of production figures at world level.

"Production" is the product of area harvested and yield. The methodology for projecting area harvested and yield for each country of the standard country list is given in Annex B.

Tobacco leaf production is projected to reach 7.1 million tonnes in 2010, about 20 percent more than in 1998 in the baseline scenario and 6.4 million tonnes or only 7 percent more than in 1998 in the policy scenario. However, again, this overall pattern conceals two strongly divergent trends. In developed countries, production is expected to continue declining, and to be lower in 2010 than in 1998. On the other hand, in developing countries, production is expected to increase to about 5.9 million tonnes in dry weight in 2010 in the baseline scenario or about 5 million tonnes in the policy scenario. Much of this increase is expected to take place in China, but production is also expected to expand in India, Brazil, Zimbabwe and Malawi.

3.3.1   Prospects for world tobacco leaf production

World tobacco production is projected to reach over 7.1 million tonnes in 2010 in the baseline scenario and over 6.6 million tonnes in the policy scenario, or about 7.5 percent more than in 1998. However, this production level is lower than the record production levels of 1992-1993 (see Figure 3.7).

**Figure 3.7 Tobacco leaf – production trends, 1970-2010
(baseline scenario) (dry weight)**
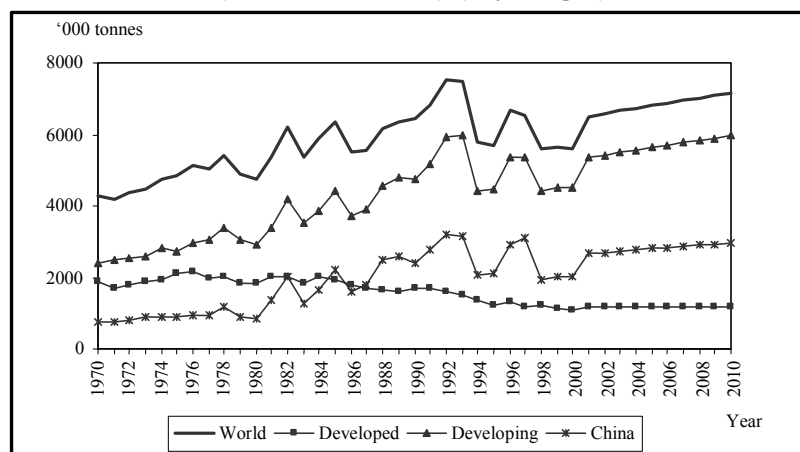
The volatility in world production is mainly due to China, which exhibits substantial volatility in the area used for tobacco cultivation (see Figure 3.7). China is expected to account for over 40 percent of world production in 2010 (see Figure 3.8).

Figure 3.8 Tobacco leaf – production share, 2010
(baseline scenario)
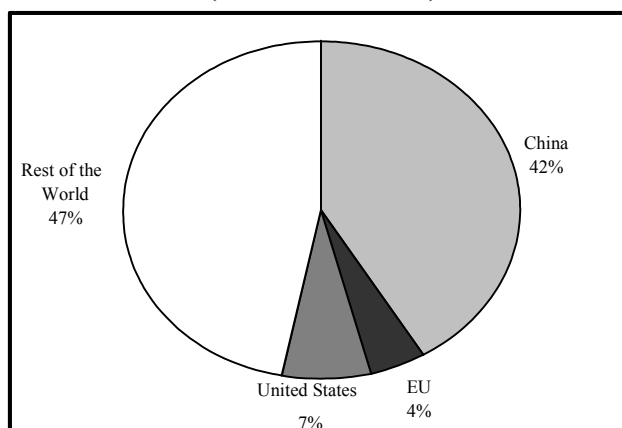
After reaching a maximum level of over 1.8 million tonnes in the early 1980s, production of tobacco leaf in the developed countries declined to 1.6 million tonnes in the early 1990s and further to 1.3 million tonnes in 1998. This contraction is expected to continue to about 1.1 million tonnes in 2010 (see Table 3.5) in the baseline scenario.

Table 3.5 Tobacco leaf production - actual and projected
(scenarios – baseline and policy) (dry weight)

| | Actual | | | | Projected | | | |
| | | | | | Baseline | | Policy | |
	1970-72	1980-82	1990-92	1997-99	2005	2010	2005	2010
				' 000 tonnes				
World	**4 269.4**	**5 455.3**	**6 936.2**	**5 938.3**	**6 809.4**	**7 160.0**	**6 098.1**	**6 430.7**
Developed	**1 797.6**	**1 959.5**	**1 659.0**	**1 178.6**	**1 180.1**	**1 195.7**	**1 081.9**	**1 115.2**
North America	*815.9*	*882.7*	*745.0*	*593.8*	*570.1*	*579.4*	*534.5*	*555.3*
United States	729.7	795.5	682.7	536.6	516.1	526.8	480.6	502.7
Europe	*544.6*	*648.3*	*602.5*	*418.8*	*460.3*	*467.2*	*418.2*	*435.9*
EU (15)	248.9	320.3	397.7	278.9	297.8	300.9	258.2	272.8
Other Europe	*295.7*	*328.0*	*204.8*	*139.9*	*162.5*	*166.3*	*160.0*	*163.1*
Area of the former USSR	*249.0*	*258.6*	*55.2*	*85.3*	*69.8*	*70.0*	*61.0*	*61.0*
Oceania	*19.4*	*15.0*	*11.7*	*6.3*	*6.0*	*6.0*	*5.4*	*5.4*
Other developed	168.7	155.0	94.4	74.4	73.9	73.1	62.8	57.6
Developing	**2 471.8**	**3 495.8**	**5 282.3**	**4 759.6**	**5 629.3**	**5 964.3**	**5 016.1**	**5 315.5**
Africa	*157.7*	*218.8*	*362.0*	*391.3*	*463.0*	*503.3*	*422.5*	*462.5*
Malawi	23.8	49.1	109.3	102.5	125.4	137.9	114.3	132.7
Zimbabwe	56.0	88.7	156.1	174.7	213.0	232.8	198.5	217.0
Latin America	*489.7*	*652.8*	*679.3*	*714.4*	*846.2*	*889.0*	*692.7*	*724.4*
Brazil	225.4	357.3	430.6	450.6	545.1	584.7	421.3	450.7
Near East	*203.7*	*237.8*	*312.8*	*268.3*	*317.3*	*337.3*	*279.2*	*298.0*
Turkey	151.1	181.2	261.4	210.5	250.2	268.8	218.6	237.2
Far East	*1 620.7*	*2 386.2*	*3 927.9*	*3 385.6*	*4 002.8*	*4 234.7*	*3 621.7*	*3 830.6*
China	755.2	1 413.6	2 780.4	2 345.6	2 806.2	2 972.5	2 505.1	2 653.5
India	335.4	431.8	507.6	514.1	628.4	685.4	596.5	650.6
Indonesia	62.6	92.1	122.5	108.4	117.9	119.6	107.8	109.0

In developing countries, however, tobacco leaf production continues to increase, thus expanding their share in world production from about 76 percent in 1991 to 87 percent in 2010. China is projected to remain the world's largest producer with 2.6 to 2.9 million tonnes in 2010, well above India with 0.68 million tonnes and Brazil with 0.58 million tonnes. Malawi and Zimbabwe, although major exporters, have much lower production levels and are projected to produce about 0.13 and 0.21 million tonnes respectively.

In the policy scenario, world production of tobacco leaf is projected to be significantly lower, reaching 6.1 million tonnes in 2005 and 6.4 million tonnes in 2010, or about 7.5 percent lower than in the baseline scenario (see Figure 3.9). These projections imply that production in 2010 will remain below the high levels of the 1990s.

Figure 3.9 Tobacco leaf production, world, 1970-2010
(scenarios – baseline and policy) (dry weight)
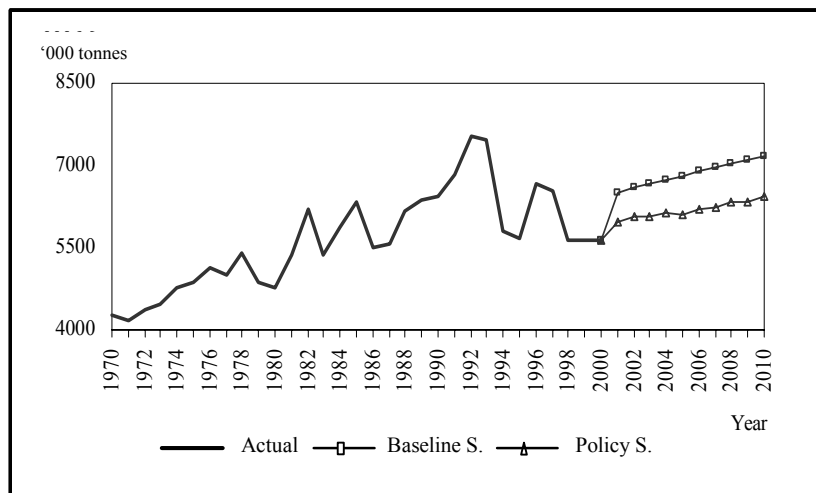
Yields and area under tobacco production

Tobacco yields (production per hectare) are determined mostly by technological factors and have increased slightly over time with the exception of cases, such as China, where the expansion of production into new, less fertile, areas has reduced average yields. Price effects on yields are much smaller and for all practical purposes can be ignored in an exercise of this kind. Therefore, yields are assumed to increase modestly in the period to 2010 at a rate determined from past trends. Yields are projected to increase in developed countries from 2.2 tonnes/ha in 1998 to 2.3 tonnes/ha in 2010 and in the developing countries from 1.6 tonnes/ha in 1998 to 1.7 tonnes/ha in 2010.

The total area used for tobacco production is projected to change little. A small decline is expected in developed countries and a small increase in developing countries. As shown in Table 3.6, the area under tobacco production in the developed countries is expected to decline slightly from 0.7 million hectares in 1998 to 0.68 million hectares in 2010. On the other hand, in developing countries, the area under tobacco is projected to increase slightly from 4.07 million hectares in 1998 to 4.57 million hectares in 2010 in the baseline scenario and remain at 4.08 million hectares in 2010 in the policy scenario.

Table 3.6 Tobacco leaf area harvested – actual and projected
(scenarios – baseline and policy)

	Area								
	Actual					**Projected**			
						Baseline		**Policy**	
	1970-72	**1980-82**	**1990-92**	**1997-99**	**2000**	**2005**	**2010**	**2005**	**2010**
	million hectares								
World	**3.80**	**4.18**	**4.99**	**4.77**	**4.17**	**5.09**	**5.26**	**4.56**	**4.72**
Developed	**1.16**	**1.19**	**0.91**	**0.70**	**0.60**	**0.68**	**0.68**	**0.63**	**0.64**
North America	*0.39*	*0.42*	*0.34*	*0.32*	*0.22*	*0.29*	*0.30*	*0.28*	*0.29*
United States	0.35	0.38	0.31	0.30	0.19	0.27	0.28	0.25	0.26
Europe	*0.47*	*0.49*	*0.41*	*0.27*	*0.27*	*0.28*	*0.28*	*0.26*	*0.26*
EU (15)	0.18	0.20	0.21	0.15	0.14	0.14	0.14	0.12	0.13
Other Europe	*0.29*	*0.29*	*0.20*	*0.12*	*0.12*	*0.14*	*0.14*	*0.13*	*0.14*
Area of the former USSR	*0.18*	*0.18*	*0.10*	*0.06*	*0.07*	*0.07*	*0.07*	*0.06*	*0.06*
Oceania	*0.01*	*0.01*	*0.01*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
Other developed	0.11	0.09	0.05	0.04	0.04	0.04	0.04	0.03	0.03
Developing	**2.64**	**2.99**	**4.08**	**4.07**	**3.58**	**4.41**	**4.57**	**3.93**	**4.08**
Africa	*0.23*	*0.25*	*0.33*	*0.38*	*0.36*	*0.41*	*0.43*	*0.37*	*0.39*
Malawi	0.05	0.07	0.12	0.12	0.11	0.13	0.14	0.12	0.13
Zimbabwe	0.05	0.05	0.07	0.10	0.09	0.10	0.11	0.10	0.10
Latin America	*0.51*	*0.58*	*0.51*	*0.61*	*0.53*	*0.66*	*0.68*	*0.55*	*0.56*
Brazil	0.25	0.31	0.30	0.35	0.32	0.39	0.41	0.30	0.31
Near East	*0.40*	*0.27*	*0.36*	*0.35*	*0.35*	*0.37*	*0.38*	*0.33*	*0.34*
Turkey	0.34	0.20	0.31	0.29	0.29	0.31	0.33	0.27	0.29
Far East	*1.49*	*1.89*	*2.88*	*2.73*	*2.33*	*2.96*	*3.08*	*2.69*	*2.79*
China	0.41	0.81	1.84	1.70	1.30	1.88	1.96	1.68	1.75
India	0.45	0.44	0.42	0.45	0.46	0.50	0.53	0.48	0.50

Figure 3.10 Area under tobacco, 1970-2010
(baseline scenario)
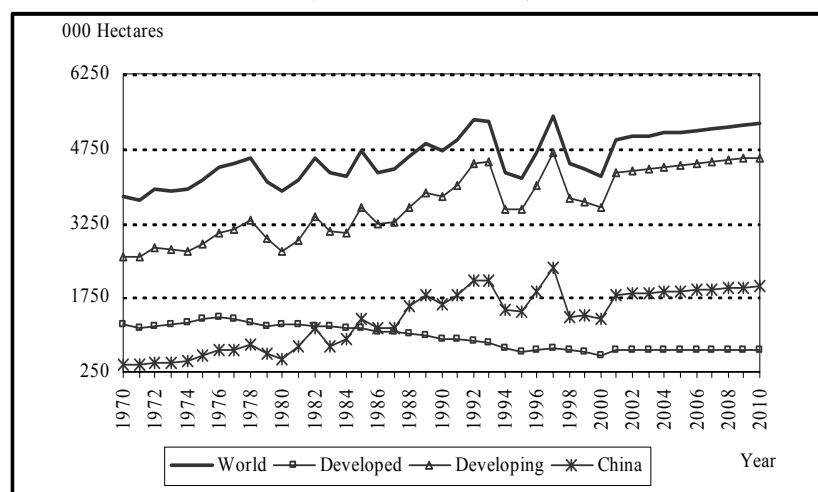
3.3.2   Prospects for tobacco production in developed countries

The major developed country producers are the United States, the EU, some other countries of Europe (such as Bulgaria) and some countries of the area of the former USSR. Trends in tobacco supply in developed countries in the baseline and the policy scenario are shown in Figure 3.11.

**Figure 3.11 Tobacco leaf production, developed countries, 1970-2010
(scenarios - baseline and policy) (dry weight)**
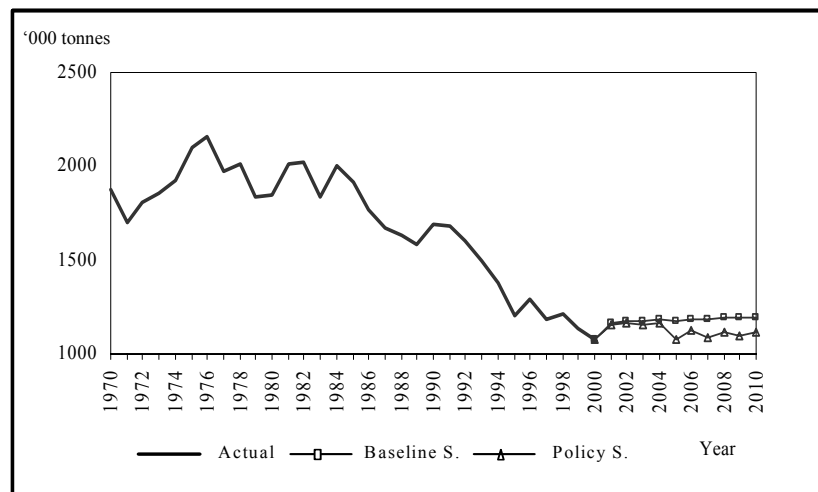
In the United States, the signing of the Tobacco Agreement in 1997 opened a new period for tobacco production. The tobacco support programme is in a transitional phase and pressure for its modification or elimination has been gaining momentum over the past decade. As a result, quotas have been reduced while in several states the quota system has been abandoned following referenda held in 2001 (USDA, 2001, p. 16). Production in the United States is expected to continue to decline in the face of weaker demand on both domestic and export markets. Domestic demand for leaf is expected to decline since domestic cigarette consumption in 2001 was projected to be 2 percent lower than 2000 (USDA, 2001, p. 4). Export volumes of both manufactured and unmanufactured tobacco also slipped between 1990 and 2000, indicating a loss of competitiveness in international markets.

In the European Union, the main tobacco producing countries are Italy, Greece and Spain. Production of tobacco leaf increased rapidly in these countries during the 1970s and to some extent in the 1980s, but declined significantly during the 1990s, following mainly the developments in the Common Agricultural Policy. Under the policies in place at present, tobacco production in the EU is expected to continue to decline, while further changes in tobacco support policies may be expected to reduce tobacco production even more.

Production in other European countries and the area of the former USSR is recovering to pre-reform levels. Some of these countries, such as Bulgaria and Bosnia, have been major tobacco producers and exporters in the past but their production contracted severely during the transition period in the 1990s. With the normalization of market conditions, production may be expected to continue to recover in these countries.

Production of tobacco leaf in other developed countries, such as Japan and Australia, is expected to follow the negative trends of the 1990s.

3.3.3   Prospects for tobacco production in developing countries

The developing countries account for 80 percent of world production of tobacco leaf and are projected to increase their share to 87 percent in 2010. China remains by far the major producer in the world.

China

In China, production of tobacco leaf has been increasing rapidly, but with wide fluctuations, particularly in the 1990s. Production reached 3 million tonnes in 1991, up from 0.8 million tonnes in

1971 and 1.5 million tonnes in 1981. Since 1993, however, tobacco production has been highly volatile mainly because of volatility in the area used for production.

The government has effective control over tobacco through the Tobacco Monopoly and through planning production, contracting areas, setting prices and controlling marketing, and this is believed to have contributed to the volatility of production in China.

Table 3.7 Area and production on tobacco in China

Year	Area	Production
	million hectares	*million tonnes farm weight*
1993	2.09	3.45
1994	1.49	2.24
1995	1.47	2.31
1996	1.85	2.23
1997	2.35	4.25
1998	1.36	2.36
1999	1.60	2.60

Figure 3.12 Tobacco leaf production, China, 1970-2010
(scenarios - baseline and policy) (dry weight)
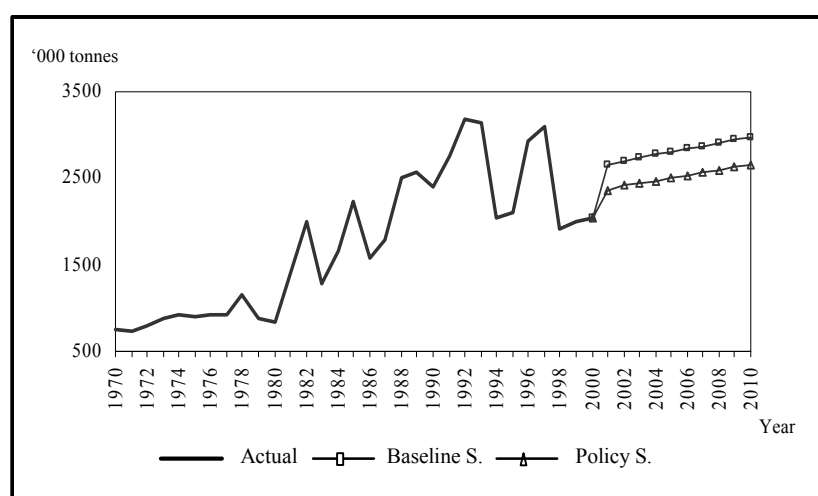
However, the recent decline in production should not be regarded as a trend, since fluctuations in production have resulted in wide fluctuations in stocks which at the beginning of 1999 were standing more than 50 percent above normal levels but have declined significantly since then. Thus, although production in next few years may remain low, it will most probably return to normal trends in the medium term.

Demand for tobacco leaf by cigarette manufacturers in China is declining (by as much as 30 percent) due to the introduction of new processing technologies and new manufacturing equipment in cigarette production. Thus, the pattern of production during the 1990s indicates that in the period to 2010 the growth rates in tobacco leaf production would be substantial, but would remain modest compared to historical rates.

Other developing countries

Among the rest of the developing countries, India is the most significant, producing over half a million tonnes of tobacco leaf in dry weight annually during the 1990s. Brazil, Turkey, Zimbabwe, Malawi are also important producers. Trends in supply from developing countries are presented in Figure 3.13.

In 1998 India grew 0.46 million hectares of tobacco, around 0.25 percent of the total cropped area, and produced about 0.64 million tonnes. Non-cigarette tobacco varieties, such as those used for bidi, account for 75 percent of total production. Production of tobacco has been encouraged by state governments by providing subsidized inputs, price and market support and export promotion. Farmers, also, favour tobacco cultivation as it generally yields higher returns than other crops, although costs are also higher. However, marketing of non-Virginia tobacco has been a problem for farmers, while the introduction of the auction system by the Tobacco Board for Virginia types has fetched better prices for farmers and has led to excess supply of Virginia type tobacco. As a result of the above it seems easier for farmers to reduce production of non-cigarette types (such as bidi) than Virginia types by shifting to other alternative cash crops. Thus, the potential for shifting from tobacco to alternative cash crops appears limited and would be likely to disturb the economic conditions of tobacco-cultivating households.

On the basis of the above observations, under the present policy regime, the area under tobacco is likely to grow only modestly although the area under Virginia and burley tobacco may continue to increase. Yields are expected to accelerate because there is considerable scope for increases in productivity and for cost reduction, thus improving the competitiveness of Indian tobacco (filter type) in the international market. Overall, production of tobacco is expected to maintain a significant growth of about 1.5 to 2.0 percent per annum (Malhotra, 2000).

**Figure 3.13 Tobacco leaf production, developing countries, 1970-2010
(scenarios - baseline and policy) (dry weight)**
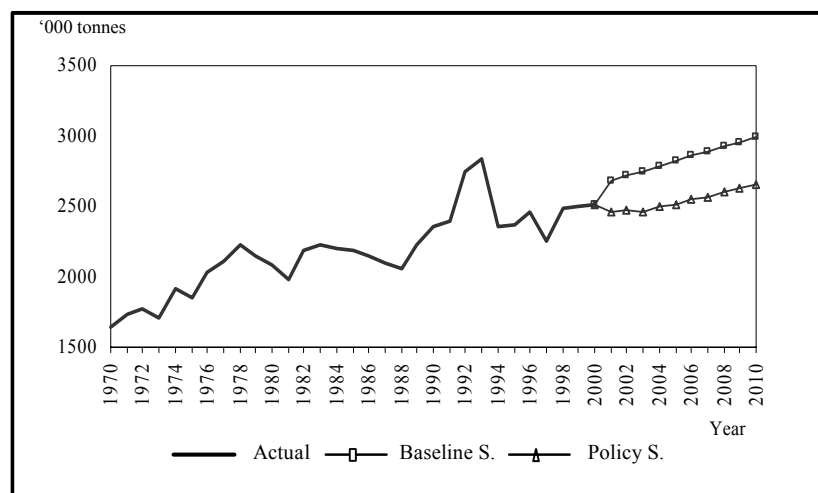
In Latin America the main producers are Brazil and Argentina. In Brazil, strong growth in production in the 1970s (4.7 percent per annum) was followed by lower growth rates (1.9 and 2.7 percent per annum in the 1980s and 1990s respectively). Given that demand in its main trading partners (the United States and Europe) may decline substantially, growth rates in the medium term are expected to moderate. However, there are few alternative crops available to farmers, and also, as the tobacco industry has invested heavily in tobacco production, there is little prospect for tobacco land to be switched to other crops. Overall, a growth rate a little lower than in the past is expected.

Argentina's tobacco production is much smaller then Brazil's but after some decline in the 1980s it now exhibits strong growth. In fact, output growth in the 1990s exceeded expectations, due to the introduction of burley and Virginia types in areas where previously dark tobacco was grown and to the strengthening demand for exports. Given that the country has limited cash crop alternatives, low production costs and several multinational tobacco companies, tobacco production is expected to continue to grow.

Africa's major tobacco producers are Zimbabwe and Malawi. In both countries production expanded rapidly in the 1970s and the 1980s, due mainly to the expansion of the area under tobacco cultivation. The growth rate was higher in Malawi, which started, however, from a lower base. The tobacco industry is well organized in both countries, and is well equipped with technology following recent substantial investments. Although demand by the major trade partners, such as the United States and the EU, is expected to be weaker in the longer term, production is expected to decline in developed countries giving an opportunity for expanding production from Africa. Overall, growth of exports during the period to 2010 is expected to be stronger than that in the base period.

In the Near East the major producer is Turkey, producing almost entirely Oriental tobacco. Turkey ranks fifth in the world in tobacco production after China, India, the United States and Brazil and produces about 4 percent of the world's tobacco. Oriental tobacco which constitutes 97 percent of total Turkish production amounts to less than 10 percent of global tobacco production and it is used for blended cigarettes. Turkey produces about 65 percent of the world's oriental tobacco, the rest being produced by Greece, Bulgaria, Bosnia and countries of the area of the former USSR. Export demand for oriental tobacco is declining, while production of burley and Virginia types is increasing to accommodate the shift in demand. Under the present price support policies, the upward trend in production observed in the 1970s and 1980s was reversed in the 1990s but production is expected to stabilize with growth rates maintained at around present levels.

3.4 PROJECTIONS OF TRADE FLOWS

The volume of tobacco exports is projected to increase further but more slowly at about 0.8 percent per year in the baseline scenario and 0.6 percent in the policy scenario during the period 1998 to 2010. The volume of exports is expected to reach 2.2 million tonnes in the baseline scenario and 2.16 million tonnes in the policy scenario, up from 2 million tonnes in 1998 and 1.7 million tonnes in 1991. In the developed countries import requirements are expected to increase considerably while export availability declines. Conversely, in the developing countries export availabilities will expand more than import requirements.

3.4.1   Overall trade trends

Trade flows are determined by trends in demand and supply in trading countries and regions of the world, but also influenced by trade policies such as tariffs and non-tariff barriers, export promotion and domestic policy.

In projecting trade flows in the baseline and policy scenarios no changes were assumed other than those applied to supply and demand. That is, no change is assumed for trade policies in either the baseline or the policy scenarios.

Actual (1970 to 1998) and projected (2005 and 2010) export flows for the world in the two scenarios are presented in Figure 3.14 with details given in Table 3.8.

As shown in Table 3.8, world export availabilities in 2005 and 2010 are expected to increase very little from 1998 levels, to 2.2 million tonnes in both scenarios. Growth rates of export flows increased from 0.7 percent in the 1970s to 2.1 percent in the 1980s and 1990s and are projected to slow down again to less than 1 percent in the period to 2010.

**Figure 3.14 Tobacco leaf exports, world, 1970-2010
(scenarios - baseline and policy) (dry weight)**

**Table 3.8 Export flows - actual and projected
(scenarios - baseline and policy) (dry weight)**

	Actual				Projected			
					Baseline		Policy	
	1970-72	1980-82	1990-92	1997-99	2005	2010	2005	2010
	'000 tonnes							
World	**1 315.9**	**1 410.1**	**1 735.0**	**2 016.0**	**2 167.2**	**2 198.9**	**2 140.0**	**2 161.0**
Developed	**564.2**	**596.4**	**730.7**	**753.6**	**794.1**	**818.3**	**790.2**	**800.1**
North America	*272.2*	*292.5*	*261.1*	*239.7*	*264.1*	*285.3*	*254.2*	*278.1*
United States	240.2	265.4	234.7	211.5	236.8	259.2	226.9	251.9
Europe	*274.0*	*295.0*	*400.6*	*412.2*	*420.8*	*421.4*	*420.9*	*403.7*
EU (15)	109.1	175.5	338.5	350.3	352.5	353.7	350.0	333.6
Other Europe	*164.8*	*119.6*	*62.0*	*61.9*	*68.3*	*67.7*	*70.9*	*70.1*
Area of the former USSR	*2.7*	*1.9*	*58.7*	*75.1*	*81.9*	*85.8*	*83.0*	*87.1*
Oceania	*0.5*	*0.6*	*0.9*	*12.2*	*12.2*	*12.1*	*12.4*	*12.3*
Other developed	14.8	6.3	9.1	14.5	15.2	13.7	19.7	18.9
Developing	**751.7**	**813.7**	**1 011.2**	**1 262.3**	**1 373.1**	**1 380.6**	**1 349.8**	**1 360.8**
Africa	*151.4*	*168.5*	*275.8*	*328.8*	*387.9*	*405.3*	*381.3*	*402.3*
Malawi	23.9	48.5	97.1	113.1	144.4	150.5	140.9	154.2
Zimbabwe	57.2	102.6	155	174.3	209.1	221.5	206.2	215.4
Latin America	*258.6*	*266.2*	*346.3*	*450.4*	*460.1*	*455.1*	*452.3*	*447.0*
Brazil	93.7	152.7	225.6	320.8	329.1	327.6	319.7	317.9
Near East	*101.8*	*113.4*	*105.9*	*157.6*	*195.5*	*187.3*	*171.4*	*164.9*
Turkey	92.5	106.5	101.5	149	186.2	178.4	162.3	156.5
Far East	*239.9*	*265.6*	*283.2*	*325.5*	*329.7*	*333.0*	*344.7*	*346.7*
China	30.9	37.7	70.4	113.8	116.0	124.2	109.7	117.3
India	91	97.7	76.6	104.2	113.5	113.6	126.7	126.9

Actual (1970 to 1998) and projected (2005 and 2010) imports for the world are presented in Figure 3.15 and Table 3.9. Consistent with export availability trends, import requirements, after strong growth in the period 1970 to 1998, are expected to slow down considerably in the period 1998 to 2010, being projected at about 2.2 million tonnes in 2010 in both scenarios.

The projected trade flows indicate that during the period to 2010 export availability in developed countries will remain about the same as in the late 1990s and will increase a little in the developing countries. Also, import requirements will remain about the same in both the developed and the

developing countries. The projected trends in trade flows indicate world prices remaining stable or declining slightly in nominal terms, and therefore indicating a significant decline in real terms.

Figure 3.15 Tobacco leaf imports, world, 1970-2010
(scenarios - baseline and policy) (dry weight)

Table 3.9 Import flows - actual and projected
(scenarios – baseline and policy)

	Actual				Projected			
					Baseline		Policy	
	1970-72	1980-82	1990-92	1997-99	2005	2010	2005	2010
	'000 tonnes							
World	**962.2**	**1 300.8**	**1 641.5**	**2 037.9**	**2 151.4**	**2 184.5**	**2 185.1**	**2 233.0**
Developed	**747.8**	**1 029.4**	**1 401.2**	**1 605.1**	**1 678.5**	**1 713.1**	**1 708.6**	**1 754.6**
North America	*113.7*	*230.3*	*267.6*	*277.4*	*237.6*	*227.1*	*241.0*	*230.7*
United States	111.7	225.8	263.5	264.9	226.6	215.1	230.0	218.6
Europe	*481.2*	*589.8*	*938.1*	*895.9*	*883.9*	*889.2*	*905.8*	*916.9*
EU (15)	397.3	483.6	808.8	732	717.2	722.6	743.8	754.2
Other Europe	*83.9*	*106.2*	*129.3*	*163.8*	*166.7*	*166.6*	*162.1*	*162.7*
Area of the former USSR	*77.4*	*104.1*	*34.2*	*291.1*	*415.1*	*457.9*	*412.7*	*458.3*
Oceania	*16.4*	*14.8*	*13.1*	*17*	*15.5*	*15.2*	*16.2*	*16.0*
Other developed	59.2	90.5	124.4	123.7	126.4	123.7	132.7	132.7
Developing	**214.4**	**271.4**	**354.2**	**432.8**	**472.9**	**471.4**	**476.5**	**478.4**
Africa	*57.5*	*49.7*	*52.4*	*56.8*	*69.0*	*71.4*	*71.5*	*76.1*
Latin America	*42.2*	*22.5*	*40.7*	*75.1*	*83.7*	*76.4*	*91.4*	*84.7*
Near East	*26.1*	*60.4*	*79.9*	*119.4*	*123.8*	*122.4*	*122.3*	*121.5*
Turkey	0	0	11.7	48.5	51.3	48.9	50.1	48.2
Far East	*87.2*	*137.8*	*180*	*181.5*	*196.4*	*201.1*	*191.3*	*196.1*
China	20.0	72.7	169.0	39.0	42.0	41.6	42.0	41.7
India	0.1	0	0.1	1.4	1.6	1.6	1.6	1.6

An important issue in the literature on tobacco control is the impact which trade liberalization might have on prices and in turn on production and consumption trends. A comprehensive policy of trade liberalization, according to the literature, would be expected to change world prices, production, consumption and trade flows for tobacco and would result in a lower world price for tobacco as the various supply controls that keep prices artificially high are removed and prices are determined by the market (Zhang, 2000).

However, price differences reflecting different demands for various kinds and qualities of tobacco would most probably continue even with trade liberalization. According to economic analysis and

some provisional evidence available in the literature, in spite of lower world prices of tobacco as a result of trade liberalization, production and consumption at world level would change little, and the volume of trade would increase only slightly.

3.4.2   Prospects for tobacco trade in developed countries

Projections to 2010 of exports from developed countries are shown in Figure 3.16. Exports are projected to increase to just over 0.8 million tonnes in each scenario, returning to the all-time record level set in 1996.

**Figure 3.16 Tobacco leaf exports, developed countries, 1970-2010
(scenarios - baseline and policy) (dry weight)**
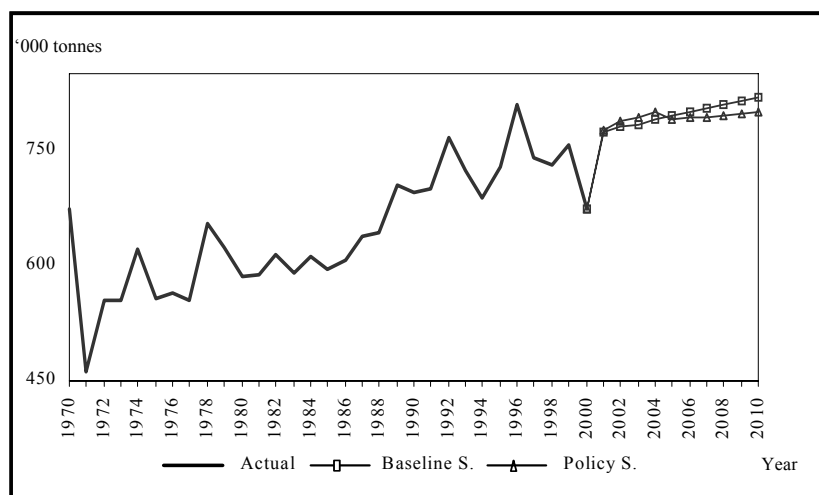
Projections of imports for developed countries are shown in Figure 3.17. Imports should continue to increase over the projection period to 2010 but at a much lower growth rate of 0.6 percent in the baseline scenario and 0.8 percent in the policy scenario, reaching an import level of just over 1.7 million tonnes in 2010, up from 1.6 million tonnes in 1998. Imports to developed countries do not share the volatility observed in exports.

Overall, in the developed countries as a group, import requirements exceed export availability in both scenarios, resulting in a trade deficit of about 0.9 million tonnes in 2010, slightly higher than the trade deficit observed in 1998 of 0.85 million tonnes. The trade balance would change little between the two scenarios, possibly because of offsetting effects of changing both the production support level and the consumption taxation level.

**Figure 3.17 Tobacco Leaf Imports, Developed Countries, 1970-2010
(scenarios - baseline and policy) (dry weight)**
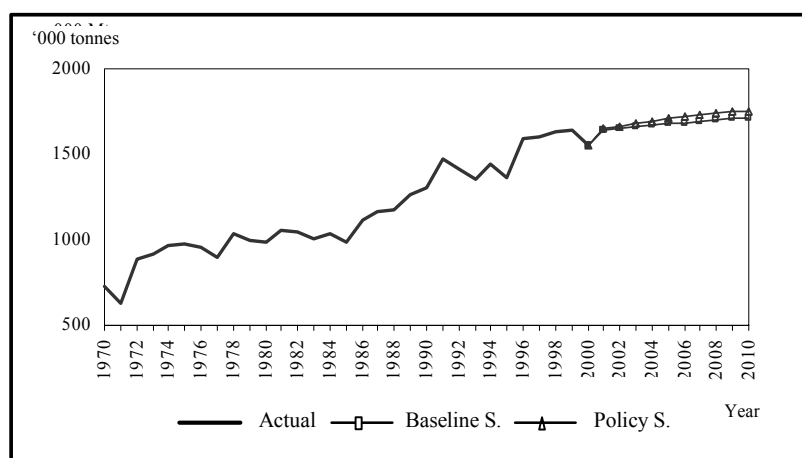
3.4.3   Prospects for tobacco trade in developing countries

China

China's tobacco and cigarette trade flows are relatively low when compared to production and consumption levels in the past decades and the situation is expected to remain the same in the period to 2010. During the 1980s tobacco exports amounted to about 30 000 tonnes or a little more than 1 percent of production. Exports, however, increased steadily during the 1990s and reached over 110 000 tonnes in 1998. Exports are projected to increase modestly in the period to 2010 and reach 120 000 to 125 000 tonnes (see Figure 3.18)

**Figure 3.18 Tobacco leaf exports, China, 1970-2010
(scenarios - baseline and policy) (dry weight)**
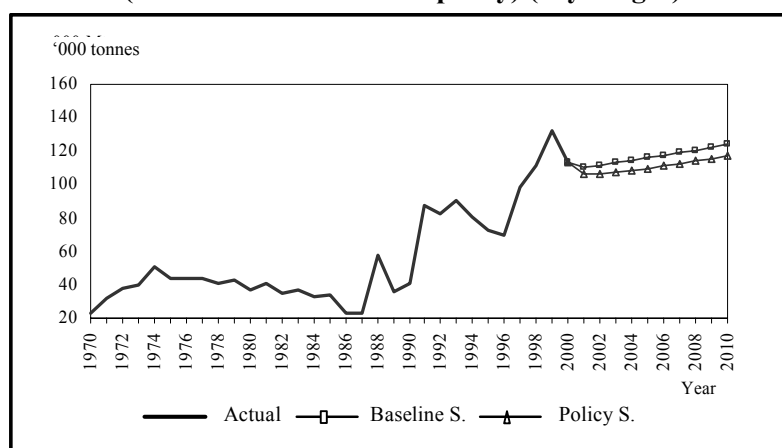
China's imports were volatile during the 1980s and the 1990s. It is not certain whether the observed decline in imports in China in the late 1990s is a structural change in the industry or a result of a temporary increase in domestic production, since the industry is state managed. The level of imports is projected to remain stable at just over 1 percent of production in the period to 2010.

**Figure 3.19 Tobacco leaf imports, China, 1970-2010
(scenarios - baseline and policy) (dry weight)**
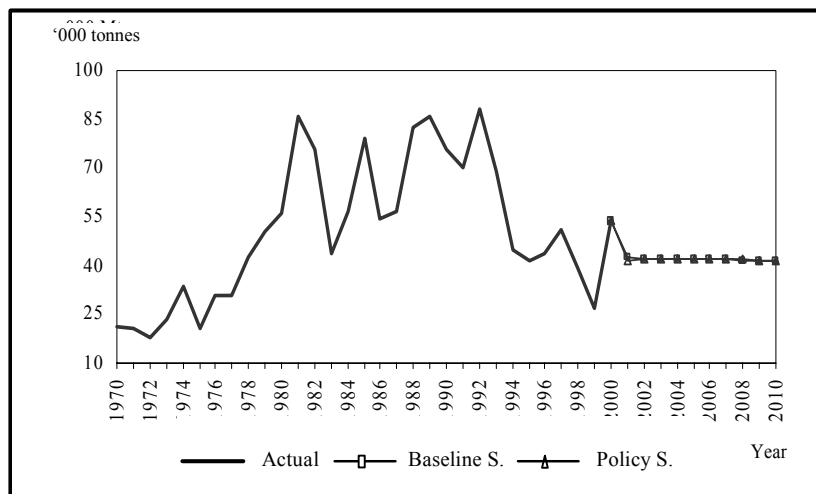
Overall, market developments seem to have little impact on trade in China, because exports and imports of both tobacco leaf and cigarettes are managed by the government. Furthermore, China's recent admission to WTO is not expected to have a significant impact on cigarette imports, because even after cutting tariffs, the price of imported cigarettes is still much higher than any domestic products. Overall, China is expected to increase its exports slightly while maintaining its level of imports during the period to 2010.

Other developing countries

Exports from other developing countries - with the exception of China, mainly Brazil, Zimbabwe, Malawi, India and Turkey - are projected to increase from 1.15 million tonnes in 1998 to 1.25 million tonnes in 2010 under both scenarios, as shown in Figure 3.20.

**Figure 3.20 Tobacco leaf exports, developing countries, 1970-2010
(scenarios - baseline and policy) (dry weight)**
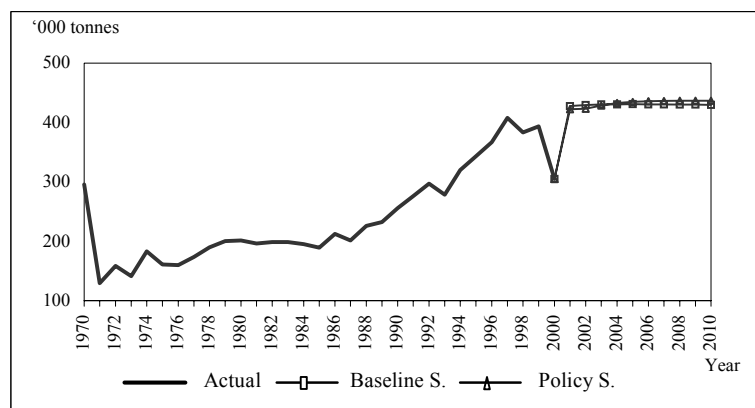
Imports to developing countries with the exception of China are projected to increase from a little less than 400 000 tonnes to about 430 000 tonnes in 2010, thus increasing at about 0.9 percent per year, as shown in Figure 3.21.

Brazil is by far the world's largest exporter with 320 000 tonnes of exports in 1998, far more than the United States, the second major exporter, with 210 000 tonnes. Exports from Brazil are projected to increase further to about 330 000 tonnes in 2010.

Zimbabwe is the largest producer of tobacco leaf in Africa and the world's fourth largest producer of flue-cured tobacco after China, Brazil and the United States. Exports are projected to increase to about 220 000 tonnes in 2010, an annual increase between 1998 and 2010 of about 2.2 percent.

Figure 3.21 Tobacco leaf imports, developing countries, 1970-2010
(scenarios - baseline and policy) (dry weight)
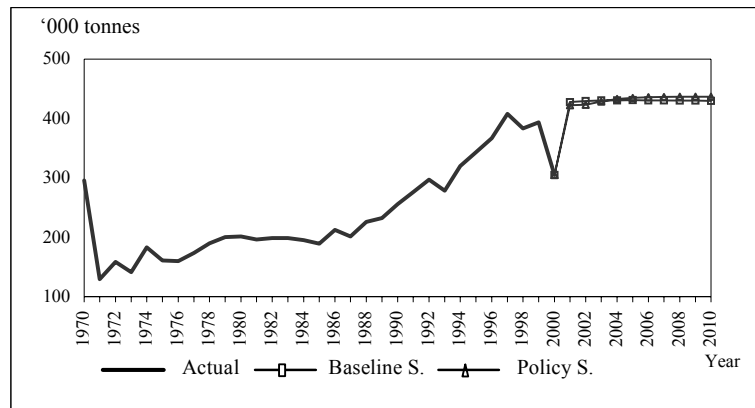
In the event of a global contraction in demand it is expected that Zimbabwe will strengthen its position relative to other exporting countries because it can reduce production costs because of its efficiency in production.

Malawi is expected to increase its exports from 113 000 tonnes in 1998 to over 150 000 tonnes in 2010, an increase of 2.8 percent per year. However, tobacco exports from Malawi have shown considerable variability from year to year, due to variable production levels.

In the event of a reduction in world tobacco demand, Malawi might be expected to compete favourably with other tobacco-exporting countries, given its demonstrated ability to expand its industry during the past two decades.

India is a significant exporter of tobacco (over 100 000 tonnes in 1998) and is expected to consolidate its position in the period to 2010. India's exports are expected to grow further, reaching 110 000 to 120 000 tonnes in 2010, or with an annual growth rate of about 0.9 or 1.6 percent in the baseline and the policy scenarios respectively. The labour intensive nature of the crop and the low cost of production confer a significant comparative advantage to India.

Turkey is the major supplier of oriental tobacco to the world market in and the only exporter in the Near East region. Turkey's production and exports are almost entirely of the oriental type, although 3 percent of total production of Virginia and burley. Turkey's exports are expected to increase in the period to 2010 from present levels of 150 000 tonnes.

3.5   OVERALL DISCUSSION OF THE RESULTS

The projections of demand show a changing consumption pattern of tobacco. Although these patterns had already started in the early 1990s, the structure of consumption would be quite different in 2010, as compared to previous decades, as shown in Figure 3.22. Although total tobacco leaf consumption is increasing at the world level, it is declining in developed countries and increasing in developing countries (excluding China). China alone is the largest consumer in the world with about 320 million

smokers out of 1.1 billion smokers world-wide and over 40 percent of world consumption. China showed a rapid growth in tobacco consumption in the early 1990s and an abrupt decline in 1997-1999, but it is most likely to increase again in the period to 2010.

Figure 3.22 Tobacco leaf consumption patterns – actual and projected (baseline scenario)
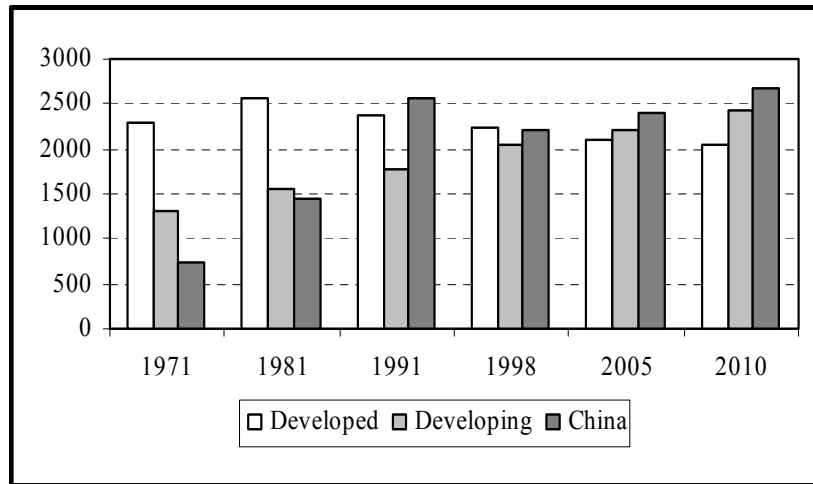
The increase in aggregate world tobacco consumption, however, conceals the fact that tobacco consumption per adult is declining and is expected to continue to decline (as shown in Figure 3.23) in both the baseline scenario and the policy scenario.

Figure 3.23 Tobacco consumption per adult, world, (kg/year) (Scenarios – baseline and policy) (dry weight)
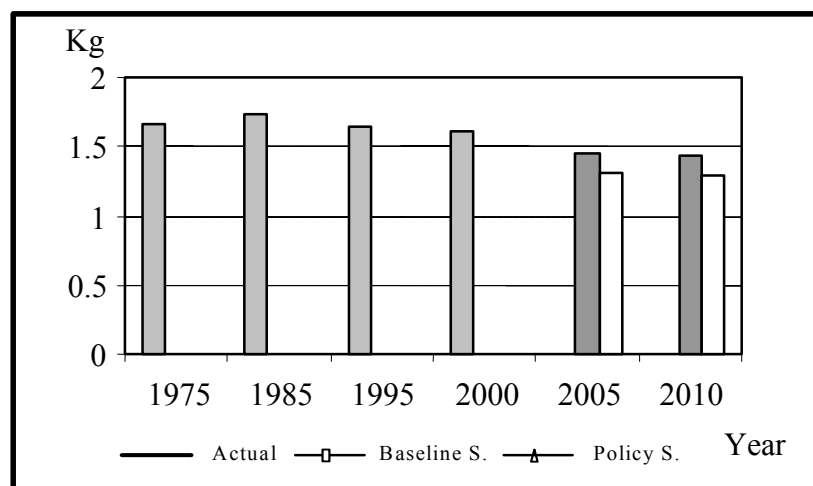
It is expected that in the baseline scenario consumption per adult will decline below 1.5 kg/year and in the policy scenario it will decline even more to about 1.3 kg/year, a decline of almost 10 percent in the baseline scenario and almost 20 percent in the policy scenario. Consumption per adult is declining not only in developed countries, but also in developing countries including China, albeit modestly. This significant development, however, is concealed by the fact that global tobacco use is rising.

Tobacco support programmes are under continuous pressure in developed countries, mainly in the United States and the EU and support will, most probably, decline or perhaps disappear in 2000-2010 decade. A widely held belief is that government support to tobacco growing increases the supply and reduces the price of tobacco products, and as a result, an end to production support is considered an

integral part of a comprehensive anti-smoking campaign. However, this belief is only partly true (see Warner, 2000, p.84). With the increasing liberalization of international trade and lower production costs in developing countries, the net effect of a cut in support would be to shift tobacco production further to developing countries, mainly Brazil, Zimbabwe, Malawi, India, Turkey and perhaps China.

In fact, exports of Brazil, Malawi and Zimbabwe are very price-competitive and this might provide the potential for them to compete successfully with other exporting countries in the event of reduced support for tobacco. For example, the export unit value of tobacco leaf from the United States is more than twice the world average, reflecting the higher quality but also higher production cost of United States tobacco. The minimum wage rate in developed countries is at least five times more than wages in many developing countries and ten times more than wages in Malawi and Zimbabwe. If cigarette manufacturers can continue to develop new processing technologies that allow them to use lower quality leaf, countries such as Malawi, Brazil and Zimbabwe would be able to compete more effectively with the United States and other developed countries in export markets and capture increasing shares of world market in the period to 2010.

The international community has provided various forms of financial assistance to Malawi and Zimbabwe over recent decades. In the event of a significant contraction in demand for tobacco, it is likely that their economies would suffer markedly, and would require assistance from international donors focussed clearly at facilitating adjustment both within agriculture and between agriculture and other sectors of the economy.

4   CONCLUSIONS AND POLICY IMPLICATIONS

The objective of this study is to review trends and developments during the period 1970 to 2000 and to provide a forward picture for tobacco production, consumption and trade to 2010. The specific objective is to use a standard commodity framework to construct a projection model for the standard list of countries and for the world. The projections take into account past trends, but also other factors that are considered important in influencing future developments in production, consumption and trade.

The study looks first at past trends and developments during the period 1970 to 2000, examining trends and estimating response parameters using the existing data set for the major countries and for the various regions of the world. The results of this first analysis are then used to form the projections model and obtain projection figures for 2005 and 2010 for tobacco production, consumption and trade. Some general conclusions derived from the previous analysis and also some policy implications are given here.

The first major result is that tobacco production is expected to continue to expand in the period 1998 to 2010 and is expected to reach the level of 7.1 million tonnes of tobacco leaf in dry weight in 2010. However, two diverse trends are apparent between the developed and the developing countries. In the developed countries production will continue to decline, while it will continue to increase in the developing countries. This implies a continuing shift in the production of tobacco leaf from developed to the developing countries, and an increasing share of the developing countries in world tobacco leaf production.

This trend is expected to be strengthened by present forces that shape production and trade policies worldwide. The price support policies for tobacco production in the developed countries are under pressure and, thus, sooner or later support levels are expected to decline. At the same time, tobacco profitability at the farm level in the developing countries is higher than in other competing cash crops. In major producing countries like Brazil and Zimbabwe there are no subsidies to production, while price and input subsidies are used for tobacco production in India and Turkey. This implies that the position of tobacco in the production system in the developing countries remains challenged. Even if price and input subsidies were to be removed, tobacco production would most likely remain in the production system of the developing countries. Given the above, the possibility of a shift of tobacco production from the developed to the developing countries will most probably be strengthened in the future.

China's production shows a variability that is probably related to the fact that the tobacco sector is managed through a state monopoly. Production in China is projected to reach about 2.6 to 2.9 million tonnes in 2010, much lower than its peak production of 4 million tonnes in 1997. However, the developments in the tobacco economy in other countries will most probably not be affected by China, taking into account the structure of the Chinese tobacco sector. Most developments in China will not affect the operation of the world market as China trades only a small proportion of its production and consumption. For this reason, the recent admission of China into WTO may have only a minor impact on the world tobacco economy.

World tobacco demand is expected to increase to between 6.5 and 7.1 million tonnes in 2010, but reflecting two contrasting tendencies. Demand in the developed countries is set to continue to decline, while demand in the developing countries continues increasing. Population and income growth play a major role in determining demand and consumption trends, but price and tax policies are also important, as are restrictions on advertising and on smoking.

While consumption in developing countries is expected to decline, demand in developing countries is expected to increase, mainly due to population and income growth. Africa and the Far East are expected to have the highest growth rates in the period 1991 to 2010. China will remain the major

consumer in the world with 2.2 million tonnes projected for 2010, which represents a 43 percent of projected world tobacco consumption in 2010.

The volume of trade of tobacco leaf is projected to increase further by 0.8 percent per annum and the traded volume to reach 2.2 million tonnes. This implies a slow expansion of tobacco trade observed in the period to 2010 relative to the rapid expansion in the 1970s and 1980s.

Overall, the results of this exercise show that demand at the world level during the period to 2010 is expected to increase but more slowly than in the period 1970 to 1998. A most important finding, however, is that global tobacco consumption per adult is expected to decline by as much as 10 percent in the baseline scenario and by as much as 20 percent with an aggressive anti-smoking policy. Lower production support and lower farm level prices for tobacco may result from an elimination of production support policies.

It is the expansion of demand in the developing countries that drives the tobacco economy of the world. Supply responds to demand and it is increasing in countries where production costs are low, there are no production restrictions and the countries have good transportation systems and access to the international market. With that in mind, we might expect to see some further shift of cigarette manufacturing, also, towards developing countries.

Given the above general conclusions, public policy to reduce tobacco use should focus on demand rather than supply. However, reducing demand in the developing countries would be rather difficult given projected population and income growth trends. Mitigating these trends, however, and reducing consumption per adult using a combination of tax and direct restriction policies, as assumed in the policy scenario, would also be an important achievement. Reducing demand will in turn imply a decline in global production of tobacco leaf.

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ANNEXES

ANNEX A. STATISTICAL ANNEX

List of countries and country groups used in this study

World
Developed
North America
Canada
United States
Europe
EU (15)
Austria
Belgium-Luxembourg
Denmark
Finland
Former Yugoslav SFR
France
Germany
Greece
Ireland
Italy
Netherlands
Portugal
Spain
Sweden
United Kingdom
Other Europe:
Albania
Bosnia and Herzegovina
Bulgaria
Croatia
Czech Republic
Hungary
Iceland
Macedonia, Former Yugoslav Republic
Malta
Norway
Poland
Romania
Slovakia
Slovenia
Switzerland
Yugoslavia FR
Area of the former USSR
Armenia
Azerbaijan
Belarus
Estonia
Georgia
Kazakhstan
Kyrgyzstan
Latvia
Lithuania
Moldova, Republic of
Russian Federation
Tajikistan
Turkmenistan
Ukraine
Uzbekistan

Oceania
Australia
New Zealand
Other Developed
Israel
Japan
South Africa
Developing
Africa
Algeria
Angola
Benin
Burkina Faso
Burundi
Cameroon
Cape Verde
Central African Republic
Chad
Congo, Democratic Republic
Congo
Côte d'Ivoire
Ethiopia
Ethiopia PDR
Gabon
Gambia
Ghana
Guinea
Kenya
Liberia
Madagascar
Malawi
Mali
Mauritania
Mauritius
Morocco
Mozambique
Niger
Nigeria
Rwanda
Senegal
Sierra Leone
Somalia
Tanzania
Togo
Tunisia
Uganda
Zambia
Zimbabwe
Latin America and the Caribbean
Antigua and Barbuda
Argentina
Belize
Bolivia
Brazil
Chile
Colombia

Costa Rica
Cuba
Dominican Republic
Ecuador
El Salvador
Guatemala
Guyana
Haiti
Honduras
Jamaica
Mexico
Nicaragua
Panama
Paraguay
Peru
Puerto Rico
Suriname
Trinidad and Tobago
Uruguay
Venezuela
Near East
Afghanistan
Cyprus
Egypt
Iran
Iraq
Jordan
Lebanon
Libya
Saudi Arabia
Sudan
Syrian Arab Republic
Turkey
Yemen
Far East
Bangladesh
Cambodia
China
China, Mainland
China, Taiwan Province
China, Hong Kong
India
Indonesia
Korea, Democratic Peoples' Republic
Korea, Republic
Laos
Malaysia
Myanmar
Nepal
Pakistan
Philippines
Singapore
Sri Lanka
Thailand
Viet Nam

POPULATION

Table A.a Population (million)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998	1999
World	**3922.7**	**4714.3**	**5606.5**	**5780.4**	**5865.6**	**5950.5**	**6035.3**	**6119.8**	**6204.0**	**6287.8**
Developed	**1087.4**	**1177.1**	**1259.6**	**1272.6**	**1278.3**	**1283.6**	**1288.6**	**1293.3**	**1297.7**	**1301.8**
North America	233.8	257.5	284.8	290.8	293.8	296.6	299.4	302.0	304.6	307.1
Canada	21.7	24.8	28.2	28.9	29.3	29.6	29.9	30.3	30.6	30.9
United States	212.1	232.6	256.7	261.9	264.5	267.0	269.4	271.8	274.0	276.2
Europe	*461.4*	*484.3*	*500.1*	*502.9*	*504.0*	*505.0*	*506.0*	*506.8*	*507.5*	*508.1*
EU 15	*342.4*	*356.1*	*366.7*	*369.5*	*370.8*	*371.9*	*372.9*	*373.7*	*374.3*	*374.8*
Austria	7.5	7.5	7.8	7.9	7.9	8.0	8.1	8.1	8.1	8.2
Belgium-Luxembourg	10.0	10.2	10.4	10.4	10.5	10.5	10.5	10.5	10.6	10.6
Denmark	5.0	5.1	5.2	5.2	5.2	5.2	5.2	5.3	5.3	5.3
Finland	4.6	4.8	5.0	5.1	5.1	5.1	5.1	5.1	5.2	5.2
France	51.2	54.1	57.0	57.5	57.8	58.0	58.3	58.5	58.7	58.9
Germany	78.0	78.1	79.9	80.9	81.3	81.7	81.9	82.1	82.1	82.2
Greece	8.8	9.7	10.3	10.4	10.4	10.5	10.5	10.6	10.6	10.6
Ireland	3.0	3.4	3.5	3.6	3.6	3.6	3.6	3.7	3.7	3.7
Italy	54.2	56.5	57.1	57.2	57.3	57.3	57.4	57.4	57.4	57.3
Netherlands	13.2	14.2	15.1	15.3	15.4	15.5	15.5	15.6	15.7	15.7
Portugal	9.0	9.8	9.9	9.9	9.9	9.9	9.9	9.9	9.9	9.9
Spain	34.1	37.8	39.4	39.5	39.5	39.6	39.6	39.6	39.6	39.6
Sweden	8.1	8.3	8.6	8.7	8.8	8.8	8.8	8.9	8.9	8.9
United Kingdom	55.8	56.4	57.7	58.0	58.2	58.3	58.4	58.5	58.6	58.7
Other Europe	*118.9*	*128.1*	*133.5*	*133.3*	*133.2*	*133.1*	*133.1*	*133.1*	*133.2*	*133.3*
Albania	2.2	2.7	3.3	3.2	3.2	3.2	3.2	3.1	3.1	3.1
Bosnia	3.6	3.9	4.1	3.7	3.5	3.4	3.4	3.5	3.7	3.8
Bulgaria	8.5	8.9	8.7	8.6	8.5	8.5	8.4	8.4	8.3	8.3
Croatia	4.2	4.4	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Czech Republic	9.8	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3
Hungary	10.4	10.7	10.3	10.3	10.3	10.2	10.2	10.2	10.1	10.1
Iceland	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Macedonia	1.6	1.8	1.9	1.9	2.0	2.0	2.0	2.0	2.0	2.0
Malta	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Norway	3.9	4.1	4.3	4.3	4.3	4.3	4.4	4.4	4.4	4.4
Poland	32.8	35.9	38.2	38.5	38.5	38.6	38.7	38.7	38.7	38.7
Romania	20.5	22.3	23.2	23.0	22.8	22.7	22.6	22.5	22.5	22.4
Slovakia	4.6	5.0	5.3	5.3	5.3	5.4	5.4	5.4	5.4	5.4
Slovenia	1.7	1.8	1.9	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Switzerland	6.2	6.3	6.9	7.0	7.1	7.1	7.2	7.3	7.3	7.3
Yugoslavia	8.8	9.6	10.2	10.4	10.5	10.6	10.6	10.6	10.6	10.6
Area of the former USSR	*245.1*	*267.7*	*290.6*	*291.8*	*291.8*	*291.8*	*291.8*	*291.7*	*291.7*	*291.6*
Armenia	2.6	3.1	3.6	3.6	3.6	3.6	3.6	3.6	3.5	3.5
Azerbaijan	5.3	6.3	7.3	7.4	7.5	7.6	7.6	7.6	7.7	7.7
Georgia	4.7	5.1	5.4	5.4	5.3	5.3	5.2	5.1	5.1	5.0
Kyrgyzstan	3.0	3.7	4.4	4.5	4.5	4.6	4.6	4.6	4.6	4.7
Tajikistan	3.0	4.1	5.4	5.6	5.7	5.8	5.8	5.9	6.0	6.1
Turkmenistan	2.3	2.9	3.8	3.9	4.0	4.1	4.2	4.2	4.3	4.4
Uzbekistan	12.4	16.4	20.9	21.7	22.1	22.5	22.8	23.2	23.6	23.9
Russian Fed.	131.1	139.6	148.5	148.6	148.3	148.1	147.9	147.7	147.4	147.2
Ukraine	47.7	50.2	51.9	51.7	51.6	51.4	51.3	51.1	50.9	50.7
Estonia	1.4	1.5	1.6	1.5	1.5	1.5	1.5	1.4	1.4	1.4
Latvia	2.4	2.5	2.7	2.6	2.6	2.5	2.5	2.5	2.4	2.4
Lithuania	3.2	3.4	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7
Belarus	9.1	9.7	10.3	10.4	10.4	10.4	10.4	10.4	10.3	10.3
Moldova	3.6	4.0	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
Kazakhstan	13.3	15.1	16.8	16.7	16.6	16.5	16.4	16.4	16.3	16.3
Oceania	*15.7*	*17.9*	*20.5*	*21.1*	*21.4*	*21.6*	*21.9*	*22.1*	*22.3*	*22.5*
Australia	12.8	14.8	17.1	17.5	17.7	17.9	18.1	18.3	18.5	18.7
New Zealand	2.9	3.1	3.4	3.5	3.6	3.7	3.7	3.8	3.8	3.8
Other developed	*131.4*	*149.8*	*163.5*	*166.1*	*167.3*	*168.5*	*169.6*	*170.7*	*171.6*	*172.5*
Israel	3.1	4.0	4.8	5.2	5.4	5.6	5.7	5.9	6.0	6.1
Japan	105.7	117.7	124.0	124.8	125.1	125.5	125.8	126.0	126.3	126.5
South Africa	22.6	28.2	34.7	36.1	36.8	37.5	38.1	38.8	39.4	39.9

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998	1999
Developing	**2835.4**	**3537.2**	**4346.9**	**4507.8**	**4587.3**	**4666.9**	**4746.7**	**4826.5**	**4906.3**	**4986.0**
Africa	*284.6*	*375.5*	*498.0*	*525.0*	*538.8*	*552.8*	*567.0*	*581.5*	*596.1*	*610.9*
Algeria	14.2	19.4	25.5	26.8	27.4	28.1	28.7	29.4	30.1	30.8
Congo, Dem. Rep.	20.8	27.9	38.9	42.2	43.9	45.4	46.8	48.0	49.1	50.3
Ethiopia	29.5	37.2	49.6	52.5	53.9	55.4	56.8	58.2	59.6	61.1
Kenya	11.9	17.3	24.3	25.8	26.5	27.2	27.9	28.4	29.0	29.5
Morocco	15.7	19.8	24.3	25.1	25.5	26.0	26.4	26.9	27.4	27.9
Mozambique	9.6	12.4	14.7	16.0	16.7	17.4	18.0	18.4	18.9	19.3
Niger	4.3	5.8	8.0	8.6	8.9	9.2	9.5	9.8	10.1	10.4
Nigeria	51.0	67.5	89.4	94.1	96.5	99.0	101.4	103.9	106.4	108.9
Latin America	*290.2*	*367.3*	*446.1*	*461.8*	*469.7*	*477.5*	*485.4*	*493.2*	*501.0*	*508.8*
Brazil	98.4	124.4	150.3	154.9	157.1	159.3	161.5	163.7	165.9	168.0
Mexico	52.3	69.2	84.8	88.0	89.6	91.1	92.7	94.3	95.8	97.4
Peru	13.6	17.8	22.0	22.7	23.1	23.5	23.9	24.4	24.8	25.2
Venezuela	11.1	15.5	20.0	20.9	21.4	21.8	22.3	22.8	23.2	23.7
Near East	*336.5*	*440.3*	*577.6*	*606.6*	*621.1*	*635.6*	*649.9*	*664.2*	*678.6*	*693.2*
Afghanistan	14.0	15.8	15.6	17.6	18.7	19.7	20.4	20.9	21.4	21.9
Egypt	36.0	44.9	57.6	59.9	61.1	62.3	63.5	64.7	66.0	67.2
Iran	29.3	40.8	57.7	60.1	61.2	62.3	63.5	64.6	65.8	66.8
Iraq	9.7	13.4	18.5	19.3	19.6	20.1	20.6	21.2	21.8	22.5
Saudi Arabia	6.0	10.2	16.5	17.4	17.8	18.3	18.8	19.5	20.2	20.9
Sudan	14.2	19.2	24.6	25.6	26.1	26.6	27.2	27.7	28.3	28.9
Syrian Arab Republic	6.5	9.0	12.8	13.5	13.8	14.2	14.6	14.9	15.3	15.7
Turkey	36.3	45.5	57.2	59.2	60.2	61.3	62.3	63.4	64.5	65.5
Yemen	6.4	8.5	12.2	13.6	14.3	15.0	15.7	16.3	16.9	17.5
Far East	*1924.1*	*2354.1*	*2825.2*	*2914.3*	*2957.7*	*3001.0*	*3044.4*	*3087.7*	*3130.7*	*3173.1*
Bangladesh	68.5	90.5	111.3	114.9	116.7	118.6	120.6	122.7	124.8	126.9
Cambodia	7.0	6.6	8.9	9.5	9.7	10.0	10.2	10.5	10.7	10.9
China, Taiwan Province	14.8	18.0	20.4	20.8	21.0	21.2	21.4	21.7	21.8	21.9
China, Mainland	836.5	994.5	1149.2	1175.5	1187.5	1199.3	1211.1	1222.5	1233.9	1244.9
India	567.8	704.0	867.5	900.7	917.2	933.7	950.0	966.2	982.2	998.1
Indonesia	123.3	154.2	185.8	191.6	194.5	197.5	200.4	203.4	206.3	209.3
Korea, DPR	14.7	17.9	20.8	21.5	21.9	22.2	22.6	23.0	23.3	23.7
Korea, Rep.	32.6	38.7	43.3	44.1	44.5	44.9	45.3	45.7	46.1	46.5
Malaysia	11.1	14.1	18.3	19.2	19.7	20.1	20.5	21.0	21.4	21.8
Myanmar	27.8	34.6	41.0	41.9	42.4	42.9	43.4	43.9	44.5	45.1
Nepal	11.6	14.9	19.3	20.3	20.8	21.3	21.8	22.3	22.8	23.4
Pakistan	67.5	88.2	122.5	129.2	132.6	136.2	140.1	144.0	148.2	152.3
Philippines	38.7	49.5	62.1	65.2	66.8	68.4	69.9	71.4	72.9	74.5
Sri Lanka	12.7	15.1	17.2	17.6	17.7	17.9	18.1	18.3	18.5	18.6
Thailand	36.9	47.6	56.3	57.5	58.1	58.6	59.2	59.7	60.3	60.9
Viet Nam	43.7	54.9	68.1	71.1	72.5	73.9	75.2	76.4	77.6	78.7

INCOME

Table A.b GDP (billion $US 1987)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998	1999
World	**10292.4**	**14093.5**	**18952.5**	**19537.7**	**20147.4**	**20724.4**	**21474.0**	**22194.4**	**22643.1**	**23311.1**
Developed	**8568.8**	**11451.1**	**15197.5**	**15430.1**	**15807.2**	**16160.6**	**16648.4**	**17119.2**	**17450.7**	**17923.6**
North America	*3254.4*	*4161.2*	*5543.5*	*5756.2*	*5977.4*	*6132.4*	*6345.3*	*6592.3*	*6844.8*	*7133.8*
Canada	225.1	336.8	445.1	457.9	475.0	484.0	490.5	509.1	524.4	548.0
United States	3029.3	3824.4	5098.4	5298.3	5502.4	5648.4	5854.8	6083.1	6320.4	6585.8
Europe	*3562.5*	*4660.6*	*5861.4*	*5860.0*	*6036.3*	*6194.1*	*6310.8*	*6471.3*	*6637.3*	*6786.2*
EU15	*3193.3*	*4145.4*	*5295.1*	*5323.9*	*5485.6*	*5624.1*	*5725.4*	*5872.2*	*6026.8*	*6167.6*
Austria	78.3	106.4	136.6	140.1	143.7	146.7	149.6	153.3	158.4	161.9
Belgium-Luxembourg	103.8	136.4	170.8	172.1	176.4	180.3	183.1	188.7	194.5	199.4
Denmark	71.7	86.7	105.7	107.4	112.1	114.6	118.4	122.0	125.6	127.6
Finland	53.2	73.5	92.8	87.9	92.2	96.9	100.8	106.4	111.4	115.3
France	593.8	797.6	1001.3	998.8	1027.3	1048.8	1064.1	1085.4	1120.1	1152.6
Germany	798.5	1005.8	1304.1	1327.2	1365.2	1391.5	1409.6	1439.2	1468.0	1488.6
Greece	35.3	52.0	63.1	64.1	65.0	66.6	68.2	70.3	72.8	75.3
Ireland	17.4	27.3	39.0	42.0	45.2	50.3	54.0	59.3	65.5	71.9
Italy	476.9	667.0	835.6	831.8	850.1	875.2	883.1	896.3	908.0	920.7
Netherlands	152.9	194.6	248.3	255.6	263.8	269.8	278.2	288.2	299.1	309.9
Portugal	24.5	37.0	50.8	51.5	52.7	54.2	55.9	57.9	60.2	62.1
Spain	186.3	249.9	340.6	340.8	348.5	358.1	366.2	379.0	394.1	408.7
Sweden	117.3	140.9	170.1	161.0	167.6	174.2	176.4	179.5	184.7	191.2
United Kingdom	483.2	570.3	736.3	743.8	775.9	797.2	818.0	846.6	864.4	882.5
Other Europe	*369.2*	*515.2*	*566.3*	*536.1*	*550.7*	*570.0*	*585.4*	*599.1*	*610.5*	*618.6*
Albania	1.9	2.6	2.2	2.0	2.2	2.4	2.6	2.5	2.7	2.9
Bosnia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bulgaria	12.5	21.6	25.1	22.7	23.2	23.7	21.3	19.4	20.1	20.4
Croatia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Czech Republic	0.0	0.0	16.0	48.1	49.1	52.0	54.6	54.0	52.8	52.7
Former Czechoslovakia	45.0	67.8	51.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hungary	15.1	23.4	22.6	20.7	21.3	21.8	22.2	23.3	24.5	25.6
Iceland	2.5	4.3	5.3	5.1	5.2	5.3	5.6	5.9	6.2	6.5
Macedonia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Malta	0.7	1.7	2.6	2.9	3.1	3.2	3.3	3.5	3.6	3.6
Norway	48.6	74.0	96.2	102.0	107.7	111.9	118.0	123.2	125.8	127.1
Poland	40.6	55.2	57.3	58.9	61.4	65.7	69.6	74.4	78.1	81.3
Romania	15.5	34.0	34.5	30.2	31.4	33.7	35.1	33.2	30.7	28.4
Slovakia	0.0	0.0	5.4	15.5	16.3	17.4	18.5	19.7	20.6	20.9
Slovenia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Switzerland	140.8	154.5	190.3	188.7	189.7	190.7	190.7	194.0	198.0	201.4
Former Yugoslav SFR	46.0	76.1	57.7	39.3	40.2	42.0	43.8	45.9	47.4	47.9
Yugoslavia FR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Area of the former USSR	*208.1*	*345.9*	*488.2*	*422.8*	*364.7*	*345.9*	*334.7*	*339.3*	*330.4*	*339.0*
USSR	208.1	345.9	331.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Armenia	0.0	0.0	0.8	2.1	2.2	2.3	2.3	2.3	2.3	2.4
Azerbaijan	0.0	0.0	1.3	3.4	2.6	2.3	2.2	2.3	2.4	2.5
Georgia	0.0	0.0	1.9	3.4	3.0	3.1	3.0	3.0	3.2	3.2
Kyrgyz tan	0.0	0.0	1.1	2.8	2.3	2.1	2.1	2.1	2.1	2.2
Tajikistan	0.0	0.0	0.5	1.4	1.2	1.0	1.0	1.0	1.0	1.1
Turkmenistan	0.0	0.0	0.9	2.3	1.9	1.8	1.7	1.7	1.8	2.2
Uzbekistan	0.0	0.0	4.4	12.8	12.1	12.0	11.6	11.8	12.3	12.8
Russian Fed	0.0	0.0	103.6	283.9	248.2	237.9	230.3	233.5	222.8	229.9
Ukraine	0.0	0.0	21.5	55.3	42.6	37.4	36.2	36.7	36.1	36.0
Estonia	0.0	0.0	1.4	3.7	3.7	3.8	3.7	3.8	3.9	3.9
Latvia	0.0	0.0	1.7	4.3	4.3	4.3	4.1	4.2	4.3	4.4
Lithuania	0.0	0.0	2.2	5.5	5.0	5.1	5.0	5.0	5.3	5.1
Belarus	0.0	0.0	7.4	20.4	17.8	16.0	15.5	15.7	17.0	17.6
Moldova	0.0	0.0	1.5	4.6	3.1	3.1	2.9	2.9	2.6	2.5
Kazakhstan	0.0	0.0	6.2	16.9	14.8	13.6	13.2	13.3	13.1	13.2
Oceania	*152.9*	*200.5*	*262.6*	*281.7*	*295.3*	*306.7*	*315.9*	*327.0*	*341.0*	*355.6*
Australia	127.1	168.7	226.5	243.1	254.6	264.5	272.6	282.4	296.8	309.9
New Zealand	25.8	31.8	36.2	38.6	40.7	42.1	43.3	44.6	44.2	45.7

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998	1999
Other developed	*1391.0*	*2082.9*	*3041.8*	*3109.4*	*3133.5*	*3181.6*	*3341.8*	*3389.3*	*3297.2*	*3308.9*
Israel	19.2	30.9	41.8	46.8	50.1	53.6	56.1	57.3	58.6	59.8
Japan	1315.9	1973.5	2914.5	2977.5	2996.0	3037.8	3192.7	3237.4	3143.5	3153.0
South Africa	55.9	78.5	85.5	85.1	87.5	90.2	93.0	94.6	95.1	96.2
Developing	**1723.6**	**2642.4**	**3755.0**	**4107.6**	**4340.1**	**4563.8**	**4825.6**	**5075.2**	**5192.4**	**5387.5**
Africa	*139.4*	*201.5*	*255.6*	*255.5*	*259.8*	*268.5*	*284.9*	*294.0*	*306.5*	*316.3*
Algeria	29.1	52.2	65.4	64.6	63.9	66.4	70.0	71.4	75.1	77.7
Cameroon	4.2	8.8	10.0	9.2	9.3	9.7	10.2	10.7	11.2	11.7
Côte d'Ivoire	6.1	9.8	10.4	10.4	10.6	11.4	12.2	12.9	13.5	14.1
Ethiopia PDR	4.3	6.3	7.3	7.9	8.2	8.7	9.7	10.3	10.2	10.9
Kenya	3.5	6.4	9.3	9.3	9.6	10.0	10.4	10.6	10.8	11.0
Morocco	9.2	15.4	22.7	22.4	24.6	23.2	25.8	25.4	27.1	27.1
Nigeria	17.6	24.4	31.1	32.9	32.7	33.6	35.0	36.3	36.9	37.3
Tunisia	4.2	7.8	11.3	12.2	12.6	12.9	13.8	14.6	15.5	16.4
Uganda	6.5	5.3	8.0	9.1	9.6	10.7	11.6	12.2	12.9	13.9
Latin America	*441.4*	*716.2*	*841.9*	*897.9*	*943.2*	*950.3*	*988.6*	*1040.5*	*1072.5*	*1075.8*
Argentina	88.4	107.1	110.1	127.6	137.8	132.3	138.6	150.5	156.4	151.6
Brazil	123.9	241.9	288.9	300.3	317.9	327.0	340.2	352.5	352.8	356.2
Chile	14.0	17.5	27.9	32.9	34.8	38.4	41.2	44.1	45.6	45.1
Colombia	18.2	29.7	41.9	45.7	48.3	51.1	52.2	53.8	54.1	51.7
Cuba	7.5	15.8	17.5	13.2	13.3	13.6	13.9	14.2	14.5	14.7
Ecuador	4.4	10.1	12.6	13.3	13.9	14.2	14.5	15.0	15.1	14.0
Guatemala	4.4	7.2	8.2	8.9	9.3	9.7	10.0	10.4	10.9	11.3
Mexico	74.3	141.6	164.1	173.1	180.6	169.4	179.5	192.4	210.6	218.4
Peru	14.8	21.2	19.0	20.5	23.2	24.9	25.5	27.4	27.4	28.1
Puerto Rico	18.2	25.7	37.6	40.0	41.0	42.4	43.8	45.2	46.5	47.9
Venezuela	35.5	45.2	53.8	57.7	56.4	58.4	58.2	61.2	61.6	57.9
Near East	*707.5*	*962.1*	*1141.5*	*1204.7*	*1231.7*	*1279.4*	*1331.1*	*1383.9*	*1417.1*	*1453.9*
Afghanistan	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.8
Egypt	14.0	29.4	48.2	51.2	53.2	55.6	58.4	61.6	65.0	68.9
Iran	106.8	120.2	162.3	179.0	181.2	186.1	193.4	200.5	203.9	207.9
Iraq	43.0	61.0	19.6	15.9	16.1	16.3	16.4	18.9	24.0	25.3
Lebanon	13.0	6.9	8.0	9.7	10.4	11.1	11.6	12.0	12.6	13.0
Libya	26.3	42.6	46.7	47.1	46.7	46.2	47.1	48.4	49.6	50.9
Saudi Arabia	45.1	89.6	93.0	97.2	97.7	98.2	99.5	101.4	103.8	104.2
Sudan	13.5	20.6	22.6	24.8	25.8	32.3	33.5	35.8	37.6	40.2
Syrian Arab Republic	4.6	10.9	13.6	15.8	16.8	18.0	18.4	18.6	19.5	20.6
Turkey	42.2	61.3	99.9	112.5	106.4	114.0	121.6	130.8	134.9	128.1
Far East	*435.2*	*762.7*	*1516.0*	*1749.5*	*1905.5*	*2065.6*	*2221.1*	*2356.8*	*2396.3*	*2541.5*
Bangladesh	13.6	18.2	27.7	30.2	31.3	33.0	34.7	36.7	38.6	40.3
China, Taiwan Province	26.2	61.6	133.9	151.9	161.7	171.5	181.1	193.5	202.9	212.2
China, Mainland	80.2	143.0	360.6	461.6	521.4	577.4	633.8	690.5	744.3	797.2
China, Hong Kong	13.4	32.1	59.6	66.9	70.5	73.2	76.5	80.6	76.5	78.7
India	145.1	205.2	351.3	382.5	412.9	446.5	478.8	504.0	534.8	567.9
Indonesia	26.6	54.6	103.9	119.8	128.8	139.3	150.2	157.0	136.3	137.0
Korea DPR	3.2	9.5	15.8	14.0	13.8	13.2	13.4	13.7	14.0	14.2
Korea Rep.	36.6	78.6	191.2	214.9	233.5	254.4	272.4	287.5	268.2	296.9
Malaysia	11.6	24.8	44.7	52.3	57.2	62.5	67.9	73.4	67.8	71.6
Myanmar	5.6	9.1	10.0	11.2	12.0	12.8	13.6	14.1	14.9	15.1
Pakistan	13.6	23.0	41.9	45.6	47.4	49.8	52.1	51.9	53.7	55.7
Philippines	19.6	33.9	38.6	39.5	41.2	43.1	45.7	48.0	47.7	49.3
Singapore	6.6	14.9	29.5	34.7	38.4	41.7	44.6	48.0	48.2	50.8
Sri Lanka	3.1	5.1	7.6	8.3	8.8	9.3	9.6	10.2	10.7	11.2
Thailand	18.3	35.5	77.6	90.9	99.1	107.8	113.8	113.3	101.7	106.0

PRODUCTION

Table A.1.1 Tobacco leaf – area harvested (million hectares)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998	1999
World	**3.80**	**4.19**	**4.95**	**5.30**	**4.25**	**4.15**	**4.67**	**5.39**	**4.46**	**4.34**
Developed	**1.16**	**1.19**	**0.87**	**0.82**	**0.72**	**0.64**	**0.68**	**0.73**	**0.70**	**0.66**
North America	*0.39*	*0.42*	*0.34*	*0.33*	*0.30*	*0.30*	*0.32*	*0.37*	*0.32*	*0.29*
United States	0.35	0.38	0.31	0.30	0.27	0.27	0.30	0.34	0.29	0.26
Europe	*0.47*	*0.49*	*0.37*	*0.33*	*0.29*	*0.24*	*0.25*	*0.27*	*0.27*	*0.26*
EU (15)	*0.18*	*0.20*	*0.21*	*0.18*	*0.16*	*0.15*	*0.15*	*0.15*	*0.15*	*0.15*
Greece	0.09	0.09	0.08	0.08	0.08	0.07	0.06	0.07	0.07	0.07
Italy	0.04	0.06	0.08	0.06	0.05	0.05	0.05	0.05	0.05	0.05
Other Europe										
Bulgaria	0.12	0.11	0.05	0.04	0.03	0.01	0.03	0.04	0.03	0.03
Area of the former USSR	*0.18*	*0.18*	*0.10*	*0.11*	*0.09*	*0.06*	*0.06*	*0.05*	*0.07*	*0.06*
Oceania	*0.01*	*0.01*	*0.01*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
Other developed	*0.11*	*0.09*	*0.05*	*0.05*	*0.04*	*0.04*	*0.04*	*0.04*	*0.04*	*0.04*
Japan	0.07	0.06	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.02
Developing	**2.64**	**2.99**	**4.08**	**4.47**	**3.53**	**3.51**	**3.99**	**4.66**	**3.76**	**3.69**
Africa	*0.23*	*0.25*	*0.33*	*0.39*	*0.31*	*0.34*	*0.37*	*0.40*	*0.38*	*0.37*
Malawi	0.05	0.07	0.12	0.13	0.08	0.11	0.11	0.11	0.11	0.12
Zimbabwe	0.05	0.05	0.07	0.09	0.07	0.08	0.09	0.10	0.10	0.09
Latin America	*0.51*	*0.58*	*0.51*	*0.60*	*0.51*	*0.48*	*0.51*	*0.55*	*0.61*	*0.56*
Argentina	0.07	0.05	0.06	0.07	0.05	0.05	0.06	0.07	0.08	0.07
Brazil	0.25	0.31	0.30	0.37	0.32	0.29	0.31	0.34	0.35	0.34
Mexico	0.04	0.04	0.02	0.04	0.03	0.02	0.02	0.02	0.03	0.03
Near East	*0.40*	*0.27*	*0.36*	*0.38*	*0.26*	*0.26*	*0.29*	*0.34*	*0.35*	*0.35*
Turkey	0.34	0.20	0.31	0.34	0.23	0.21	0.24	0.29	0.29	0.29
Far East	*1.49*	*1.89*	*2.88*	*3.10*	*2.44*	*2.43*	*2.82*	*3.36*	*2.42*	*2.41*
China, Mainland	0.40	0.80	1.83	2.09	1.49	1.47	1.85	2.35	1.36	1.37
India	0.45	0.44	0.42	0.42	0.38	0.38	0.39	0.43	0.46	0.46
Indonesia	0.16	0.19	0.21	0.17	0.18	0.22	0.22	0.22	0.22	0.22

Source: FAO

Table A.1.2 Tobacco leaf – production (farm weight - '000 tonnes)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998	1999
World	**4743.7**	**6061.4**	**7706.9**	**8307.0**	**6438.1**	**6309.6**	**7423.1**	**8982.6**	**6937.0**	**6972.2**
Developed	**1997.3**	**2177.3**	**1843.3**	**1667.6**	**1537.9**	**1339.6**	**1438.7**	**1627.8**	**1495.6**	**1404.6**
North America	*906.5*	*980.7*	*827.8*	*809.3*	*788.1*	*650.2*	*757.5*	*887.0*	*744.5*	*656.3*
United States	810.7	883.9	758.6	731.8	718.0	576.0	688.9	810.8	671.3	586.4
Europe	*605.1*	*720.4*	*669.5*	*569.4*	*512.1*	*494.7*	*504.3*	*537.6*	*532.8*	*534.6*
EU (15)	*276.6*	*355.9*	*441.9*	*387.4*	*347.6*	*355.7*	*352.5*	*354.3*	*356.4*	*357.8*
Greece	89.7	128.7	161.4	167.9	141.6	148.5	133.8	137.0	137.1	139.8
Italy	79.4	133.8	186.4	135.7	120.6	124.5	130.6	130.5	132.5	131.0
Other Europe	*133.3*	*134.8*	*227.6*	*182.0*	*164.5*	*139.0*	*151.7*	*183.3*	*176.4*	*176.8*
Bulgaria	133.3	134.8	71.6	45.6	32.7	18.8	39.8	61.3	38.7	33.6
Area of the former USSR	*276.7*	*287.3*	*61.3*	*185.6*	*137.1*	*96.7*	*80.9*	*99.7*	*114.3*	*111.8*
Oceania	*21.5*	*16.6*	*13.0*	*12.2*	*9.2*	*7.0*	*8.6*	*8.6*	*8.5*	*7.1*
Other developed	*187.5*	*172.2*	*104.9*	*91.1*	*91.4*	*91.0*	*87.5*	*94.9*	*95.5*	*94.8*
Japan	153.0	139.5	73.9	60.7	71.9	70.4	66.0	68.5	64.0	64.7
Developing	**2746.4**	**3884.2**	**5869.2**	**6639.5**	**4900.2**	**4970.0**	**5984.3**	**7354.8**	**5441.4**	**5567.6**
Africa	*175.2*	*243.1*	*402.2*	*490.0*	*384.6*	*443.2*	*481.3*	*528.7*	*533.0*	*440.3*
Malawi	26.4	54.6	121.4	133.8	99.3	129.4	141.7	158.1	124.6	112.8
Zimbabwe	62.2	98.6	173.5	235.3	177.8	198.4	208.7	215.4	260.0	193.2
Latin America	*544.1*	*725.4*	*754.7*	*960.1*	*774.6*	*701.7*	*777.3*	*928.0*	*866.0*	*944.7*
Argentina	67.1	60.5	90.4	112.3	82.0	79.0	98.2	123.2	116.5	113.4
Bolivia	1.8	1.9	0.9	0.8	0.9	0.9	0.9	0.9	0.9	1.0
Brazil	250.5	397.0	478.4	657.0	519.0	455.3	470.9	597.0	505.4	626.1
Mexico	69.4	72.2	28.1	31.7	30.3	27.4	42.6	32.2	48.8	50.6
Near East	*226.3*	*264.3*	*347.5*	*397.6*	*232.4*	*270.2*	*291.7*	*355.4*	*337.7*	*336.3*
Turkey	167.9	201.3	290.4	338.8	187.0	204.4	225.2	286.4	261.9	260.0
Far East	*1800.8*	*2651.4*	*4364.3*	*4791.1*	*3508.1*	*3554.5*	*4433.5*	*5542.7*	*3704.7*	*3846.3*
China, Mainland	821.1	1548.0	3070.8	3468.4	2256.5	2326.7	3234.0	4251.0	2364.0	2469.0
India	372.6	479.8	564.0	596.5	562.9	566.7	535.2	618.0	646.0	701.7
Indonesia	69.6	102.3	136.1	121.4	130.1	140.2	151.0	136.7	137.6	140.8

Source: FAO

Table A.1.3 Cigarettes – production ('000 tonnes)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998	1999
World	**2981**	**4499**	**5370**	**5300**	**5478**	**5598**	**5680**	**5633**	**5580**	**5567**
Developed	**1991**	**2602**	**2480**	**2362**	**2452**	**2527**	**2541**	**2498**	**2470**	**2532**
North America	*638*	*783*	*754*	*707*	*781*	*798*	*808*	*768*	*730*	*696*
Canada	52	68	46	46	56	52	50	48	50	50
United States	586	715	708	661	726	746	758	720	680	646
Europe	*725*	*1073*	*1070*	*1002*	*1047*	*1109*	*1087*	*1072*	*1067*	*1085*
EU (15)	*448*	*717*	*746*	*708*	*723*	*760*	*758*	*759*	*755*	*763*
France	70	66	53	48	48	46	47	45	43	43
Germany	146	184	216	208	221	221	193	182	182	205
Italy	68	75	58	55	55	50	52	52	51	45
Netherlands	26	41	82	84	88	101	111	116	116	120
Spain	49	82	86	78	82	77	71	75	78	73
United Kingdom	145	150	127	117	115	156	170	170	164	155
Other Europe										
Bulgaria	62	85	66	32	54	75	57	45	33	38
Poland	77	88	90	100	98	101	95	96	97	95
Area of the former USSR	*338*	*365*	*286*	*281*	*272*	*276*	*296*	*330*	*333*	*419*
Oceania	*33*	*41*	*41*	*39*	*39*	*38*	*37*	*36*	*37*	*36*
Other developed	*256*	*340*	*329*	*333*	*314*	*306*	*314*	*293*	*303*	*296*
Japan	235	306	284	289	269	263	271	255	267	263
Developing	**991**	**1898**	**2890**	**2938**	**3025**	**3071**	**3139**	**3135**	**3110**	**3035**
Africa	*37*	*83*	*98*	*102*	*106*	*105*	*107*	*107*	*101*	*102*
Algeria	7	16	19	20	21	21	21	21	22	22
Morocco	5	12	12	10	13	13	13	13	13	13
Latin America	*219*	*335*	*355*	*335*	*354*	*365*	*370*	*373*	*365*	*303*
Antigua Barb	0	0	0	0	0	0	0	0	0	0
Argentina	31	35	36	39	41	41	41	42	42	43
Brazil	77	137	168	149	164	174	182	183	170	108
Mexico	44	53	52	49	47	46	47	47	47	47
Near East	*80*	*124*	*167*	*173*	*192*	*200*	*214*	*220*	*227*	*234*
Egypt	15	29	41	39	39	42	45	47	48	48
Iran	13	11	15	16	16	16	16	16	16	16
Iraq	6	8	17	13	13	13	14	14	14	14
Turkey	42	56	67	78	94	100	109	112	118	125
Far East (Asia and Pacific)	*655*	*1355*	*2268*	*2327*	*2374*	*2400*	*2447*	*2433*	*2416*	*2396*
China, Mainland	388	856	1630	1676	1710	1735	1700	1684	1684	1675
India	63	87	86	88	89	95	102	99	98	97
Indonesia	35	87	153	162	177	186	212	225	216	220
Korea Rep.	45	71	94	97	91	88	93	94	104	97
Pakistan	23	36	31	33	36	33	46	46	48	52
Philippines	43	64	70	71	65	57	79	69	75	69

Source: USDA

Table A.1.4 Cigars – production ('000 tonnes)

	1970	1980	1990	1991	1992	1993	1994	1995	1996	1997	1998
World	**2.1**	**170.2**	**217.4**	**216.4**	**193.7**	**171.3**	**77.4**	**81.3**	**90.0**	**93.5**	**93.2**
Developed	**2.1**	**31.9**	**24.6**	**16.3**	**15.8**	**14.2**	**12.2**	**10.3**	**11.5**	**11.9**	**11.7**
North America	*0.0*	*27.8*	*14.9*	*14.9*	*13.7*	*12.0*	*10.1*	*9.6*	*9.6*	*10.2*	*10.0*
Canada	0.0	0.5	0.1	0.1	0.1	1.2	0.7	0.7	0.7	0.7	0.7
United States	0.0	27.3	14.8	14.8	13.7	10.9	9.4	8.9	8.9	9.5	9.3
Europe	*2.1*	*4.1*	*9.6*	*1.3*	*2.0*	*2.1*	*2.0*	*0.6*	*1.9*	*1.7*	*1.7*
EU (15)	*2.1*	*1.9*	*1.2*	*1.3*	*2.0*	*2.1*	*2.0*	*0.6*	*1.9*	*1.7*	*1.7*
Belgium-Luxembourg	2.1	1.1	0.3	0.6	1.4	1.5	1.4	0.0	1.3	1.3	1.2
Spain	0.0	0.8	0.9	0.7	0.6	0.6	0.6	0.6	0.6	0.4	0.5
Area of the former USSR	*0.0*	*0.0*	*0.0*	*0.0*							
Other developed	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Developing	**0.0**	**138.3**	**192.5**	**199.8**	**177.5**	**156.7**	**64.8**	**70.6**	**78.5**	**81.6**	**81.5**
Africa	*0.0*	*1.4*	*7.5*	*7.5*	*7.5*	*7.5*	*5.5*	*5.5*	*5.8*	*5.8*	*5.8*
Cameroon		1.4	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
Central African Republic			0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.7
Latin America	*0.0*	*65.3*	*57.4*	*56.2*	*38.1*	*25.7*	*27.6*	*36.8*	*42.7*	*44.1*	*45.6*
Argentina	0.0	0.0	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0
Brazil	0.0	55.0	7.0	6.0	5.0	5.0	6.0	5.0	6.0	3.0	4.5
Colombia	0.0	2.1	0.7	0.3	0.4	0.3	0.3	0.0	0.0	0.0	0.0
Cuba		5.3	44.0	44.0	27.4	15.0	17.0	28.0	33.0	37.0	37.0
Ecuador		0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Honduras	0.0	0.4	1.5	1.4	1.3	1.2	1.2	1.2	1.2	1.2	1.2
Jamaica		0.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Mexico	0.0	0.0	1.9	2.1	1.8	1.9	0.9	0.4	0.1	0.5	0.5
Nicaragua		2.2	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0
Near East	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Far East	*0.0*	*71.6*	*127.6*	*136.1*	*131.9*	*123.5*	*31.8*	*28.3*	*30.1*	*31.8*	*30.2*
Bangladesh		8.7	0.5	0.5	0.5	0.5					
China, Mainland			85.0	87.5	84.7	83.0					
Indonesia	0.0	13.5	20.8	25.8	21.6	21.0	19.2	18.8	20.2	21.1	20.1
Philippines	0.0	31.5	13.4	14.4	19.9	15.0	10.6	8.0	8.9	9.9	9.5
Thailand	0.0	17.9	7.9	7.9	5.2	4.0	2.0	1.5	1.0	0.8	0.6

Source: USDA

Table A.1.5 Flue-cured tobacco – production ('000 tonnes)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998
World	**1856.2**	**3541.1**	**4921.6**	**5361.7**	**3746.5**	**3755.4**	**4784.6**	**5947.1**	**3997.7**
Developed	**1275.8**	**1315.7**	**1096.9**	**987.0**	**711.4**	**666.3**	**743.2**	**785.2**	**718.5**
North America	*589.0*	*592.2*	*486.7*	*486.5*	*464.6*	*415.9*	*497.7*	*520.6*	*453.5*
Canada	92.6	98.9	69.8	84.2	70.0	77.8	64.5	70.3	68.5
United States	496.4	493.2	416.9	402.3	394.6	338.1	433.2	450.3	385.0
Europe	*555.8*	*600.9*	*206.1*	*160.4*	*163.7*	*174.0*	*176.0*	*183.4*	*185.4*
EU (15)	*504.9*	*526.9*	*146.3*	*128.3*	*127.3*	*126.4*	*124.8*	*127.3*	*127.7*
Greece	0.1	0.1	49.3	43.0	37.5	34.5	33.5	35.5	33.0
Italy	7.8	24.5	55.9	47.2	46.0	48.0	47.8	47.6	48.2
Spain	0.6	2.5	30.0	27.0	29.0	29.0	27.4	29.0	29.0
Other Europe									
Bulgaria	8.0	24.7	11.4	7.5	6.3	7.7	7.6	10.2	9.8
Croatia	11.5	0.0	0.0				12.0	11.2	11.2
Poland	4.5	19.0	20.4	12.8	15.3	23.0	21.6	24.5	25.0
Romania	27.5	0.0	2.6	3.1	5.4	5.1	4.7	4.8	5.1
Area of the former USSR	*0.0*	*0.0*	*225.3*						
USSR	0.0	0.0	85.7	257.0	0.0	0.0	1.1	1.7	1.8
Oceania	*21.6*	*17.9*	*14.9*	*14.0*	*9.6*	*9.1*	*9.1*	*9.2*	*9.0*
Australia	18.1	14.4	13.4	12.5	8.1	7.6	9.1	9.2	9.0
Other Developed	*109.4*	*104.8*	*78.2*	*69.1*	*73.5*	*67.3*	*59.2*	*70.3*	*68.7*
Japan	90.1	83.2	49.0	42.0	51.5	48.0	41.7	45.5	42.5
South Africa	19.3	21.6	29.2	27.1	22.0	19.3	17.5	24.8	26.3
Developing	**580.3**	**2225.3**	**3822.3**	**4370.7**	**3030.8**	**3084.6**	**4041.4**	**5161.8**	**3279.2**
Africa	*96.2*	*144.6*	*229.7*	*292.6*	*236.2*	*269.7*	*282.4*	*267.5*	*295.3*
Malawi	6.7	22.5	24.4	25.5	22.0	22.5	15.4	14.9	14.0
Tanzania	8.8	13.0	13.6	21.0	18.2	20.0	25.1	25.1	25.1
Zimbabwe	62.0	92.3	168.4	218.4	169.2	199.5	201.6	187.3	215.9
Latin America	*175.9*	*305.4*	*432.1*	*539.6*	*404.3*	*371.3*	*414.3*	*543.8*	*444.6*
Argentina	24.4	36.9	52.6	64.2	41.7	43.1	58.8	75.3	82.4
Brazil	122.7	227.0	326.7	428.0	315.0	289.0	317.0	429.0	315.0
Mexico	6.6	8.6	9.4	15.2	18.8	7.3	7.2	7.7	11.3
Venezuela	7.8	11.6	7.9	8.8	6.9	10.6	10.5	11.0	13.5
Near East	*6.8*	*79.3*	*57.9*	*21.2*	*23.4*	*24.8*	*23.4*	*23.7*	*24.8*
Iran	4.5	2.9	4.4	5.3	5.3	5.3	5.3	5.3	5.3
Syrian Arab Republic	0.7	2.3	3.3	3.8	5.1	5.8	5.8	5.8	5.8
Turkey	0.5	0.9	2.4	4.2	5.0	5.8	3.7	4.0	5.1
Far East	*301.5*	*1696.0*	*3102.6*	*3517.3*	*2366.9*	*2418.9*	*3321.3*	*4326.8*	*2514.4*
Bangladesh	0.6	11.3	13.3	25.0	20.0	20.0	15.0	15.0	15.0
China, Mainland	0	1280.8	2682.7	3007.0	1940.0	2010.0	2946.0	3908.0	2089.0
China, Taiwan Province	0	22.7	19.2	18.1	19.0	13.9	11.4	10.3	10.1
India	104.1	117.8	123.2	158.9	125.0	110.0	127.0	171.0	162.0
Indonesia	16.9	29.2	40.5	39.5	40.8	42.0	44.6	42.9	49.9
Korea Rep.	57.5	69.8	47.3	62.9	58.1	51.0	41.2	36.1	36.3
Malaysia	3.1	9.3	10.6	9.9	6.2	10.1	12.0	11.4	11.4
Pakistan	20.6	28.4	34.2	54.1	59.0	58.3	39.4	47.0	50.0
Philippines	33.2	41.7	47.7	53.3	35.7	39.4	40.0	41.3	45.0
Thailand	16.7	45.4	36.8	50.0	24.0	25.0	24.0	23.0	25.0

Source: USDA

Table A.1.6 Burley tobacco – production ('000 tonnes)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998
World	714.0	1053.0	870.1	1043.7	862.9	792.3	834.5	1151.6	966.1
Developed	621.9	806.5	432.8	413.3	403.8	378.3	370.4	427.2	441.4
North America	267.6	320.3	299.1	286.5	277.8	250.8	244.2	294.4	310.0
United States	266.5	319.4	298.7	286.5	277.8	250.8	244.2	294.4	310.0
Europe	340.5	461.7	109.5	103.3	100.1	102.5	102.6	109.4	109.4
EU (15)	332.1	435.2	85.7	83.9	79.9	80.9	82.5	84.6	83.5
Greece	13.1	20.6	9.0	13.0	12.6	12.4	14.0	14.2	14.2
Italy	35.2	50.7	54.4	46.1	43.7	46.0	45.1	47.2	44.7
Spain	15.8	36.6	14.4	14.0	12.7	12.7	12.6	12.9	12.8
Other Europe									
Poland	0.0	5.1	7.5	8.3	8.8	11.0	7.5	13.0	13.0
Yugoslavia	0.0	0.0	1.3	3.2	2.8	2.4	4.4	3.3	4.0
Area of the former USSR	0.0	0.0	0.0						
Other developed	13.4	23.9	24.2	23.4	25.9	25.0	22.6	21.8	20.5
Japan	12.3	21.1	24.2	23.4	25.9	25.0	22.6	21.8	20.5
Developing	92.2	246.5	436.1	627.0	455.9	410.6	464.1	724.4	524.7
Africa	16.8	65.5	109.1	134.8	93.0	100.2	142.4	157.2	144.3
Malawi	6.2	21.7	79.4	103.2	70.0	75.0	117.9	133.9	118.0
Tunisia	0.0	0.0	5.9	6.0	6.6	6.5	7.7	7.9	7.7
Zimbabwe	4.7	2.7	8.0	16.8	8.6	10.4	6.2	4.9	8.0
Latin America	48.3	93.8	158.8	280.9	191.1	142.6	173.1	200.8	203.4
Argentina	7.1	9.7	30.2	42.6	31.8	21.9	26.9	26.2	28.6
Brazil	13.7	25.3	68.3	135.0	80.0	53.0	70.0	100.0	85.0
Chile	3.0	2.9	9.8	13.9	10.8	7.6	6.6	7.6	8.9
Guatemala	1.2	6.7	10.5	18.5	13.2	9.2	15.3	15.1	16.7
Honduras	0.0	4.4	2.1	5.8	5.8	5.8	5.8	5.8	5.8
Mexico	15.0	27.1	18.9	45.8	32.3	24.5	26.1	23.9	35.9
Near East	0.6	2.3	5.2	4.6	5.5	5.0	5.0	5.1	4.9
Syrian Arab Republic	0.0	1.7	4.5	3.3	3.7	2.4	2.4	2.4	2.4
Turkey	0.0	0.0	0.1	0.4	1.0	1.7	1.7	1.9	1.7
Far East	26.5	84.9	162.9	206.7	166.3	162.8	143.7	361.3	172.1
China, Mainland	0.0	20.0	53.3	72.0	72.0	80.0	75.0	293.0	95.0
India	2.1	8.3	20.3	15.0	13.0	6.0	3.8	8.5	9.8
Korea Rep.	20.5	28.2	18.0	45.6	40.5	32.6	19.8	18.3	19.2
Philippines	2.4	10.8	26.2	34.1	12.8	16.3	15.2	9.7	13.0
Thailand	1.5	13.6	27.6	35.0	23.0	23.0	28.0	30.0	33.0

Source: USDA

Table A.1.7 Dark air/sun cured tobacco – production ('000 tonnes)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998
World	**1079.3**	**1085.3**	**1152.8**	**1188.4**	**1020.8**	**1107.5**	**897.3**	**909.2**	**907.4**
Developed	**219.1**	**207.4**	**115.7**	**78.8**	**82.7**	**85.4**	**67.6**	**65.6**	**67.1**
North America	*38.9*	*17.9*	*5.1*	*5.8*	*6.2*	*4.9*	*4.7*	*4.6*	*5.3*
Canada	2.0	0.5	1.0	0.7	0.8	0.8	0.8	0.8	0.8
United States	36.9	17.4	4.1	5.1	5.4	4.1	3.9	3.8	4.5
Europe	*172.8*	*184.7*	*107.5*	*68.6*	*71.1*	*77.6*	*59.3*	*57.3*	*58.0*
EU (15)	*108.0*	*97.8*	*67.3*	*35.5*	*35.0*	*32.9*	*35.0*	*32.1*	*32.0*
France	44.8	43.1	16.9	11.7	12.2	11.4	12.2	9.8	9.8
Italy	13.3	20.7	49.0	20.5	20.1	18.5	18.3	18.0	18.0
Other Europe	***0.0***	***0.0***	***0.5***						
Albania	12.8	15.3	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Hungary	3.7	10.5	5.2	6.3	6.5	11.2	6.3	7.3	8.0
Poland	26.6	48.4	15.8	8.5	11.0	15.0	0.4	0.3	0.2
Area of the former USSR	*39.3*	*5.0*	*0.0*						
Other developed									
South Africa	7.4	4.8	3.1	4.4	5.5	2.9	3.6	3.7	3.7
Developing	**820.9**	**872.9**	**1036.3**	**1107.3**	**935.9**	**1019.9**	**829.7**	**843.6**	**840.4**
Africa	*35.7*	*33.5*	*19.2*	*18.7*	*15.8*	*14.5*	*14.4*	*14.6*	*14.4*
Algeria	2.5	2.1	4.8	8.8	5.2	4.3	4.3	4.3	4.3
Congo, Rep.	2.0	0.7	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Côte d'Ivoire	1.7	0.8	2.4	2.2	2.5	2.6	2.6	2.6	2.6
Malawi	2.1	1.2	1.5	0.4	0.6	1.0	0.6	0.8	0.5
Latin America	*268.4*	*192.1*	*119.0*	*90.3*	*87.8*	*110.2*	*106.3*	*106.0*	*108.3*
Argentina	36.4	13.6	6.9	5.5	7.4	12.6	11.1	10.7	5.4
Brazil	96.5	53.3	64.0	33.0	36.0	48.0	41.0	35.6	33.0
Colombia	36.9	29.5	24.4	30.9	19.2	20.5	20.5	20.5	20.5
Dominican Rep.	23.7	35.3	13.3	13.4	16.2	17.0	21.8	26.6	36.8
Paraguay	18.0	12.6	7.4	4.5	6.0	9.1	9.1	9.1	9.1
Near East	*8.8*	*7.3*	*11.7*	*11.7*	*11.7*	*11.7*	*11.7*	*11.7*	*11.7*
Iran	6.2	6.0	7.2	7.2	7.2	7.2	7.2	7.2	7.2
Far East	*508.1*	*640.1*	*886.3*	*986.6*	*820.6*	*883.6*	*697.2*	*711.2*	*706.0*
Bangladesh	37.4	16.1	21.8	48.0	38.0	38.0	29.0	29.0	29.0
China, Mainland	0.0	91.5	251.7	362.4	216.0	250.0	35.0	37.5	30.0
India	261.0	321.3	426.5	397.7	380.0	400.0	425.0	429.7	438.0
Indonesia	60.4	63.5	91.7	92.3	100.0	109.0	112.2	117.5	111.4
Korea DPR	0.0	12.3	18.4	18.4	18.4	18.4	25.0	25.0	25.0
Myanmar	39.8	46.9	26.0	15.2	15.5	15.5	41.4	41.4	41.4
Pakistan	18.1	8.7	24.8	24.4	24.4	24.4	1.2	2.6	2.7
Viet Nam	12.5	17.1	18.0	20.8	20.8	20.8	20.0	20.0	20.0

Source: USDA

Table A.1.8 Dark fire-cured tobacco – production ('000 tonnes)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998
World	**75.2**	**73.6**	**60.1**	**47.6**	**53.0**	**50.3**	**52.6**	**49.2**	**50.0**
Developed	**54.8**	**55.5**	**32.8**	**31.7**	**35.1**	**32.8**	**33.3**	**29.3**	**29.5**
North America	*18.9*	*19.2*	*15.8*	*18.6*	*21.9*	*18.1*	*20.1*	*19.2*	*20.0*
United States	18.9	19.2	15.8	18.6	21.9	18.1	20.1	19.2	20.0
Europe	*35.9*	*36.3*	*17.0*	*13.2*	*13.1*	*14.7*	*13.3*	*10.1*	*9.5*
EU (15)	*26.9*	*28.9*	*7.6*	*6.7*	*6.1*	*6.0*	*6.4*	*6.7*	*7.0*
Italy	8.0	9.7	7.6	6.7	6.1	6.0	6.4	6.7	7.0
Other Europe	***0.0***	***0.0***	***0.0***						
Poland	9.0	7.4	9.4	6.5	7.0	8.7	6.9	3.4	2.5
Developing	**20.3**	**18.1**	**26.9**	**14.6**	**16.8**	**16.2**	**19.3**	**19.9**	**20.5**
Africa	*16.4*	*15.1*	*25.9*	*13.7*	*16.0*	*15.6*	*19.2*	*19.9*	*20.4*
Kenya	0.0	0.6	3.7	3.7	3.7	3.7	7.7	7.7	7.7
Malawi	11.7	9.5	15.9	4.2	6.0	9.5	7.7	8.4	9.0
Latin America	*0.4*	*0.1*	*1.0*	*0.9*	*0.8*	*0.6*	*0.1*	*0.1*	*0.1*
Mexico	0.0	0.0	1.0	0.9	0.8	0.6	0.1	0.1	0.1
Near East	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
Far East	*3.5*	*3.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*

Source: USDA

Table A.1.9 Light air-cured tobacco – production ('000 tonnes)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998
World	**164.3**	**190.4**	**74.9**	**68.9**	**75.7**	**69.4**	**91.5**	**92.4**	**100.6**
Developed	**77.3**	**82.1**	**17.5**	**12.4**	**13.0**	**12.5**	**10.8**	**11.0**	**9.9**
North America	*12.6*	*17.4*	*8.3*	*8.6*	*9.0*	*8.5*	*7.3*	*8.0*	*7.0*
United States	12.6	17.4	8.3	8.6	9.0	8.5	7.3	8.0	7.0
Europe	*15.5*	*24.5*	*5.7*	*1.9*	*2.0*	*2.0*	*1.7*	*1.8*	*1.8*
EU (15)	*12.9*	*19.5*	*5.7*	*1.9*	*2.0*	*2.0*	*1.7*	*1.8*	*1.8*
Italy	0.2	2.2	3.5	1.9	2.0	2.0	1.7	1.8	1.8
Other Europe									
Czechoslovakia	0.2	1.4	0.0						
Other developed	*49.2*	*40.2*	*3.5*	*2.0*	*2.1*	*2.0*	*1.7*	*1.1*	*1.1*
Japan	46.0	37.5	3.4	2.0	2.1	2.0	1.7	1.1	1.1
Developing	**87.0**	**108.3**	**57.3**	**56.2**	**62.1**	**55.8**	**80.7**	**81.5**	**90.7**
Africa	*13.6*	*15.7*	*11.1*	*11.1*	*11.1*	*11.1*	*23.0*	*23.0*	*23.0*
Congo, Rep	0.2	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Madagascar	2.0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Nigeria	6.2	7.2	6.4	6.4	6.4	6.4	17.3	17.3	17.3
Latin America	*39.4*	*26.7*	*19.5*	*17.6*	*23.9*	*19.6*	*23.9*	*23.5*	*20.9*
Argentina	0.0	0.0	0.5	0.0	0.9	1.4	1.4	0.4	0.5
Brazil	0.0	0.0	12.7	7.0	5.0	3.0	5.0	9.0	5.0
Colombia	0.0	0.0	1.2	1.3	1.0	1.1	1.1	1.1	1.1
Costa Rica	1.3	0.9	0.8	1.1	1.1	1.1	1.1	1.1	1.1
Mexico	37.7	24.1	3.5	7.7	15.4	12.5	14.8	11.3	12.7
Near East	*0.2*	*0.1*	*0.5*	*0.4*	*0.4*	*0.3*	*0.3*	*0.3*	*0.3*
Syrian Arab Republic	0.0	0.0	0.5	0.4	0.4	0.3	0.3	0.3	0.3
Far East	*33.8*	*65.9*	*26.2*	*27.1*	*26.7*	*24.8*	*33.5*	*34.7*	*46.6*
India	8.6	42.1	7.8	9.0	10.0	8.5	7.0	14.5	26.0
Korea DPR	0.0	0.0	3.1	9.2	9.2	9.2			
Pakistan	21.9	15.2	5.9	7.8	6.4	6.0	25.5	19.1	19.5

Source: USDA

Table A.1.10 Oriental tobacco – production ('000 tonnes)

Oriental	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998
World	**778.3**	**872.6**	**786.4**	**790.0**	**555.3**	**539.3**	**585.8**	**585.8**	**702.7**
Developed	**525.1**	**612.7**	**428.0**	**357.9**	**310.1**	**269.7**	**284.3**	**284.3**	**324.3**
Europe	*285.0*	*326.4*	*208.2*	*155.0*	*134.1*	*126.0*	*163.3*	*163.3*	*195.0*
EU (15)	*95.8*	*129.4*	*123.2*	*105.3*	*98.0*	*97.0*	*94.8*	*94.8*	*95.1*
Greece	76.4	104.6	107.2	92.0	85.3	85.0	83.5	83.5	82.8
Italy	19.4	24.8	16.0	13.3	12.7	12.0	11.3	11.3	12.3
Other Europe									
Bulgaria	118.9	115.7	59.5	40.1	26.8	20.1	33.4	33.4	65.4
Romania	13.9	24.0	2.8	2.3	2.8	2.7	2.9	2.9	2.8
Area of the former USSR	*238.4*	*284.7*	*171.3*						
USSR	0.0	0.0	47.9	202.2	175.1	143.0	120.4	120.4	128.7
Azerbaijan	0.0	0.0	11.4	36.0	36.0	31.0	10.0	10.0	10.5
Georgia	0.0	0.0	2.3	8.8	8.8	8.8	8.8	8.8	8.8
Kyrgyz tan	0.0	0.0	6.1	55.6	45.0	21.0	30.0	30.0	30.0
Moldova	0.0	0.0	13.4	48.3	39.6	36.0	23.9	23.9	32.6
Tajikistan	0.0	0.0	1.8	10.6	10.6	10.6	10.6	10.6	10.6
Uzbekistan	0.0	0.0	6.3	18.8	18.8	18.8	24.7	24.7	23.3
Other Developed	*1.7*	*1.6*	*0.5*	*0.7*	*0.8*	*0.7*	*0.6*	*0.6*	*0.6*
South Africa	0.5	1.1	0.5	0.7	0.8	0.7	0.6	0.6	0.6
Developing	**253.2**	**260.0**	**358.3**	**432.0**	**245.1**	**269.4**	**301.5**	**301.5**	**378.4**
Africa	*0.3*	*0.6*	*2.2*	*2.4*	*2.5*	*2.5*	*2.4*	*2.4*	*2.3*
Ethiopia	0.0	0.0	0.0	1.8	1.8	1.8	1.8	1.8	1.8
Malawi	0.2	0.6	0.4	0.6	0.7	0.7	0.6	0.6	0.6
Latin America	*1.7*	*2.0*	*0.4*	*0.2*	*0.2*	*0.2*	*0.0*	*0.0*	*0.0*
Chile	0.0	0.0	0.2	0.2	0.2	0.2			
Near East	*201.3*	*234.8*	*315.7*	*386.3*	*206.5*	*231.0*	*252.5*	*252.5*	*318.5*
Iran	7.8	10.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Iraq	13.8	8.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Lebanon	7.8	4.2	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Syrian Arab Republic	7.9	8.8	8.7	6.7	5.1	8.7	8.7	8.7	8.7
Turkey	163.1	202.9	287.2	359.9	181.7	202.6	224.0	224.0	290.0
Far East	*49.9*	*22.5*	*40.2*	*43.1*	*35.9*	*35.7*	*46.6*	*46.6*	*57.5*
China, Mainland	0.0	0.0	7.2	9.6	10.0	10.0	20.0	20.0	25.0
Pakistan	49.4	17.6	20.0	18.5	15.9	16.7	14.1	14.1	17.0
Thailand	0.2	4.9	12.9	15.0	10.0	9.0	12.5	12.5	15.5

Source: USDA

CONSUMPTION

Table A.2.1 Tobacco leaf – consumption (dry weight - '000 tonnes)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998	1999
World	**4193.9**	**5404.0**	**6616.6**	**7031.9**	**7040.3**	**6398.6**	**6584.6**	**6922.2**	**6720.5**	**5868.1**
Developed	**2297.0**	**2568.0**	**2384.4**	**2256.9**	**2235.6**	**2168.8**	**2238.1**	**2318.0**	**2207.7**	**2257.2**
North America	*712.6*	*774.6*	*699.6*	*777.8*	*729.4*	*669.1*	*765.5*	*822.3*	*665.0*	*617.3*
Canada	66.4	68.4	41.7	49.5	60.6	58.8	45.0	56.2	51.5	43.1
United States	646.1	706.2	657.9	728.3	668.8	610.3	720.5	766.1	613.6	574.2
Europe	*997.8*	*1147.5*	*1188.4*	*1040.3*	*1047.5*	*1023.5*	*989.0*	*970.4*	*1032.6*	*1008.9*
EU (15)	*715.4*	*811.4*	*905.9*	*760.6*	*749.4*	*724.2*	*730.8*	*704.7*	*762.5*	*724.8*
France	114.1	100.0	82.7	51.7	52.7	59.4	63.9	67.7	58.7	51.8
Germany	0.0	0.0	171.4	182.2	186.1	159.4	151.2	161.9	143.7	152.1
Italy	76.1	83.4	68.1	62.7	52.6	58.7	58.9	51.7	63.3	53.5
Netherlands	68.0	67.5	87.1	72.0	89.0	86.7	91.7	97.5	80.4	136.3
Spain	76.5	101.0	101.4	81.8	78.0	74.7	67.4	76.9	73.1	79.8
United Kingdom	99.3	142.2	116.6	129.5	119.4	118.1	155.3	130.8	225.2	128.1
Other Europe	*282.4*	*336.0*	*282.5*	*279.7*	*298.2*	*299.5*	*258.1*	*265.8*	*270.2*	*284.3*
Poland	74.3	82.2	81.9	86.4	84.1	84.4	73.3	65.7	74.2	81.5
Romania	26.9	33.5	12.6	26.9	22.2	19.8	29.7	35.8	32.0	37.7
Area of the former USSR	*319.3*	*362.9*	*248.2*	*201.6*	*241.3*	*227.3*	*222.5*	*273.3*	*276.7*	*384.4*
Oceania	*32.4*	*31.5*	*25.2*	*23.1*	*19.5*	*19.4*	*27.0*	*25.6*	*24.3*	*25.9*
Developing	**2059.2**	**3013.5**	**4339.1**	**4775.0**	**4804.7**	**4229.8**	**4346.5**	**4604.2**	**4512.8**	**3610.9**
Africa	*114.5*	*117.6*	*151.8*	*174.8*	*156.7*	*177.1*	*144.8*	*191.9*	*189.6*	*191.3*
Latin America	*340.5*	*429.5*	*375.0*	*389.8*	*409.0*	*426.1*	*438.3*	*459.4*	*484.7*	*428.9*
Argentina	46.4	39.1	40.9	50.1	48.1	45.1	43.6	43.8	42.0	46.1
Brazil	120.5	218.8	200.6	225.2	253.7	244.1	225.0	237.0	241.3	209.8
Mexico	51.4	45.9	32.9	13.5	4.2	20.4	31.8	31.6	35.6	43.2
Near East	*130.4*	*218.4*	*242.8*	*250.4*	*276.2*	*277.1*	*285.0*	*298.6*	*239.5*	*266.6*
Turkey	59.5	108.5	134.7	141.6	196.8	174.3	136.0	147.0	105.7	125.5
Far East	*1472.4*	*2247.0*	*3567.8*	*3958.9*	*3961.6*	*3348.5*	*3477.6*	*3653.3*	*3598.4*	*2723.5*
China	739.0	1442.7	2526.0	2939.0	2868.9	2243.1	2336.3	2496.3	2467.6	1588.0
India	235.8	326.1	407.3	441.0	449.5	445.6	458.5	476.7	481.0	474.5
Indonesia	42.1	104.1	121.4	100.9	132.0	160.0	166.8	142.1	113.4	158.3

Source: USDA

Table A.2.2 Cigarettes – consumption ('000 tonnes)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998	1999
World	**2992**	**4269**	**5195**	**5148**	**5272**	**5349**	**5325**	**5271**	**5339**	**5264**
Developed	**1981**	**2312**	**2309**	**2244**	**2309**	**2365**	**2295**	**2235**	**2312**	**2282**
North America	*652*	*689*	*572*	*511*	*560*	*566*	*567*	*554*	*534*	*506*
United States	600	636	530	483	509	518	518	507	485	457
Europe	*650*	*837*	*948*	*958*	*998*	*1029*	*931*	*873*	*934*	*903*
EU (15)	*433*	*583*	*672*	*669*	*715*	*739*	*663*	*602*	*659*	*628*
France	72	69	98	109	102	95	90	91	89	90
Germany	146	156	145	134	141	157	115	128	122	124
Greece	18	24	26	30	32	26	19	24	35	32
Italy	73	81	92	92	97	89	91	93	94	95
Netherlands	20	18	21	44	22	29	24	23	32	25
Spain	53	67	111	92	96	100	91	80	89	91
United Kingdom	125	90	96	91	152	161	156	93	126	94
Other Europe										
Poland	75	81	104	104	96	101	92	92	93	90
Romania	26	35	27	36	37	41	33	32	33	40
Area of the former USSR	*387*	*429*	*371*	*358*	*347*	*371*	*382*	*414*	*436*	*472*
Oceania	*33*	*35*	*41*	*39*	*38*	*38*	*35*	*33*	*33*	*33*
Other developed										
Japan	237	289	329	333	321	317	337	320	337	332
Developing	**1011**	**1956**	**2886**	**2904**	**2963**	**2984**	**3030**	**3036**	**3026**	**2983**
Africa	*41*	*94*	*114*	*118*	*121*	*123*	*123*	*122*	*118*	*117*
Algeria	7	16	19	20	21	23	22	21	22	22
Morocco	6	13	14	13	16	16	16	16	16	16
Nigeria	9	15	19	19	19	19	19	19	19	19
Tunisia	0	6	8	9	9	10	9	8	11	11
Latin America	*222*	*338*	*340*	*301*	*290*	*292*	*282*	*276*	*266*	*227*
Argentina	31	36	37	41	41	41	42	42	42	43
Brazil	76	136	149	115	106	110	102	96	83	45
Mexico	44	53	52	49	47	46	47	47	47	47
Near East	*90*	*166*	*213*	*215*	*231*	*237*	*243*	*248*	*257*	*263*
Egypt	14	30	39	38	38	41	44	46	47	47
Iran	13	14	24	24	24	24	24	24	24	24
Iraq	7	8	17	13	13	13	14	14	14	14
Turkey	42	63	77	83	95	97	99	100	109	116
Far East	*658*	*1358*	*2218*	*2270*	*2320*	*2331*	*2381*	*2390*	*2386*	*2375*
China, Mainland	388	856	1618	1644	1656	1686	1660	1666	1664	1655
India	62	84	84	86	88	94	101	98	97	96
Indonesia	35	87	136	140	161	165	193	202	199	203
Korea Rep.	46	68	99	103	98	99	103	104	107	101
Malaysia	7	18	18	17	17	17	20	20	19	19
Pakistan	23	37	30	33	36	32	46	47	52	55
Philippines	43	59	68	77	78	61	78	69	75	72
Thailand	16	31	40	43	46	45	49	49	40	40

Source: USDA/FAO

EXPORTS

Table A.3.1 Tobacco leaf – exports ('000 tonnes)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998	1999
World	**1315.9**	**1410.1**	**1735.0**	**1787.5**	**1708.4**	**1689.0**	**2029.3**	**2015.2**	**1985.0**	**2020.2**
Developed	**564.2**	**596.4**	**730.7**	**724.3**	**688.3**	**728.2**	**809.6**	**740.9**	**731.7**	**757.6**
North America	*272.2*	*292.5*	*261.1*	*235.9*	*218.5*	*230.8*	*255.8*	*260.4*	*245.0*	*213.6*
United States	240.2	265.4	234.7	211.8	200.1	210.4	223.4	228.9	215.2	190.5
Europe	*274.0*	*295.0*	*400.6*	*375.1*	*378.2*	*406.8*	*478.0*	*404.1*	*406.8*	*427.8*
EU (15)	*109.1*	*175.5*	*338.5*	*327.9*	*330.4*	*345.8*	*412.2*	*345.8*	*342.1*	*363.1*
Greece	65.6	64.2	118.5	119.1	106.4	118.8	129.9	95.1	98.3	100.9
Italy	16.2	73.0	127.8	124.5	110.7	116.1	138.6	98.9	95.7	93.9
Other Europe	***0.0***	***0.0***	***62.0***	***47.1***	***47.8***	***61.2***	***65.9***	***58.3***	***67.9***	***60.4***
Bulgaria	61.0	68.1	24.1	15.1	21.3	30.5	21.2	12.9	20.1	25.4
Area of the former USSR	*2.7*	*1.9*	*58.7*	*101.0*	*71.6*	*78.4*	*66.4*	*62.6*	*67.2*	*92.1*
Oceania	*0.5*	*0.6*	*0.9*	*2.1*	*2.2*	*0.5*	*0.2*	*0.8*	*0.9*	*1.8*
Other developed	*14.8*	*6.3*	*9.1*	*10.1*	*17.6*	*11.7*	*9.3*	*12.8*	*14.7*	*16.2*
Japan	4.7	0.1	0.3	0.8	0.7	0.6	0.5	0.6	0.2	0.3
Developing	**751.7**	**813.7**	**1011.2**	**1063.2**	**1020.1**	**960.8**	**1219.6**	**1274.3**	**1253.3**	**1262.6**
Africa	*151.4*	*168.5*	*275.8*	*311.6*	*316.2*	*301.9*	*359.1*	*325.7*	*368.3*	*293.3*
Malawi	23.9	48.5	97.1	95.7	98.3	98.0	112.1	116.8	129.6	93.0
Zimbabwe	57.2	102.6	155.0	188.3	189.8	176.0	204.2	165.0	194.1	163.9
Latin America	*258.6*	*266.2*	*346.3*	*362.0*	*375.7*	*351.9*	*410.5*	*449.8*	*422.0*	*479.5*
Argentina	16.3	20.0	45.5	41.4	38.0	43.4	55.8	65.2	52.8	72.6
Bolivia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Brazil	93.7	152.7	225.6	243.5	275.5	256.3	282.4	319.0	300.5	343.0
Mexico	13.4	21.3	10.3	14.5	7.2	7.5	15.2	12.0	13.8	10.5
Near East	*101.8*	*113.4*	*105.9*	*94.7*	*107.0*	*88.7*	*166.3*	*174.5*	*162.7*	*137.4*
Turkey	92.5	106.5	101.5	91.4	103.7	82.6	162.0	162.5	155.1	129.3
Far East	*239.9*	*265.6*	*283.2*	*294.7*	*221.2*	*218.4*	*283.7*	*324.3*	*228.0*	*288.3*
China, Mainland	27.4	25.0	80.4	86.0	75.5	69.4	63.2	89.0	106.0	131.6
India	91.0	97.7	76.6	90.5	42.9	77.7	106.6	117.9	75.0	119.6
Indonesia	21.7	24.3	29.6	37.9	30.9	22.0	33.2	42.3	47.0	37.1

Source: FAO

Table A.3.2 Tobacco leaf – export value (million US$)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998	1999
World	**1 427**	**4 277**	**5 506**	**5 000**	**5 043**	**5 107**	**6 525**	**6 877**	**6 304**	**6 059**
Developed	**907**	**2 348**	**2 775**	**2 468**	**2 442**	**2 595**	**2 875**	**2 999**	**2 867**	**2 831**
North America	*591*	*1 546*	*1 609*	*1 414*	*1 383*	*1 473*	*1 504*	*1 696*	*1 572*	*1 377*
United States	535	1 456	1 523	1 322	1 317	1 404	1 396	1 583	1 467	1 301
Europe	*291*	*779*	*1 121*	*941*	*947*	*1 020*	*1 269*	*1 190*	*1 175*	*1 303*
EU (15)	*149*	*428*	*845*	*780*	*795*	*847*	*1 073*	*1 003*	*987*	*1 057*
Germany	11	22	65	64	94	96	139	133	140	158
Greece	98	191	349	338	295	302	370	347	326	362
Italy	17	98	175	170	154	182	251	203	203	185
Other Europe	***75***	***195***	***130***	***56***	***49***	***64***	***61***	***37***	***51***	***64***
Bulgaria	75	195	130	56	49	64	61	37	51	64
Area of the former USSR	*5*	*6*	*26*	*80*	*69*	*69*	*69*	*65*	*85*	*119*
Kyrgyzstan	0	0	9	38	18	22	16	17	29	30
Moldova Rep.	0	0	7	21	14	16	14	12	26	32
Russian Fed.	0	0	0	1	12	2	2	3	1	1
Ukraine	0	0	0	0	0	2	2	1	1	3
Oceania	*1*	*3*	*2*	*7*	*7*	*4*	*0*	*3*	*2*	*3*
Other developed	*19*	*14*	*18*	*25*	*36*	*30*	*33*	*44*	*32*	*28*
South Africa	11	14	17	13	20	10	18	24	32	28
Developing	**520**	**1 929**	**2 731**	**2 532**	**2 601**	**2 512**	**3 650**	**3 878**	**3 437**	**3 229**
Africa	*120*	*409*	*765*	*634*	*894*	*820*	*1 124*	*1 015*	*919*	*778*
Malawi	31	125	312	213	197	294	312	353	358	274
Tanzania	9	17	19	17	21	27	49	54	55	43
Zimbabwe	65	251	413	373	652	474	732	574	458	426
Latin America	*115*	*602*	*971*	*976*	*921*	*1 007*	*1 351*	*1 490*	*1 285*	*1 262*
Argentina	8	38	125	117	87	101	129	186	120	166
Brazil	39	374	683	697	694	769	1 029	1 091	940	893
Near East	*109*	*353*	*446*	*404*	*406*	*261*	*547*	*588*	*539*	*498*
Turkey	98	326	430	396	395	245	539	565	520	479
Far East	*175*	*565*	*550*	*518*	*380*	*424*	*628*	*785*	*694*	*691*
China, Mainland	25	39	113	135	94	100	111	196	182	208
India	57	202	124	118	59	117	185	248	137	215
Indonesia	27	49	66	66	53	61	84	105	148	92

Source: FAO

Table A.3.3 Tobacco leaf – world price and export unit value

Year	World Price	Export Unit Value							
		Brazil	**China**	**India**	**Malawi**	**Turkey**	**United States**	**Zimbabwe**	**EU**
1970	1.247	0.580	0.890	0.304	1.210	1.062	2.131	1.083	1.170
1971	1.473	0.605	0.887	0.973	1.320	1.052	2.177	1.188	1.469
1972	1.369	0.284	0.920	0.960	1.323	1.074	2.347	1.132	1.477
1973	1.646	0.910	0.904	0.968	1.424	1.226	2.485	1.148	1.567
1974	2.008	1.068	1.087	1.258	2.696	1.819	2.855	1.472	1.946
1975	2.442	1.416	1.361	1.524	2.002	2.793	3.427	2.078	2.284
1976	2.518	1.530	1.348	1.308	2.094	3.341	3.565	1.702	2.373
1977	2.705	1.752	1.504	1.469	2.573	2.845	3.894	1.791	2.484
1978	3.086	2.062	1.674	1.905	2.484	2.914	4.317	1.880	3.024
1979	3.059	2.076	1.749	1.548	2.389	2.543	4.639	1.959	3.263
1980	3.107	2.020	1.967	2.126	2.061	2.793	4.948	1.965	2.826
1981	3.251	2.436	1.228	2.094	2.789	3.015	5.532	2.457	2.336
1982	3.487	2.841	1.324	1.992	3.127	3.320	5.997	2.955	2.240
1983	3.432	2.635	1.364	1.965	2.621	3.421	6.188	2.717	2.208
1984	3.230	2.457	1.465	1.835	2.318	3.104	6.189	2.539	1.908
1985	3.164	2.263	1.305	1.828	1.803	3.215	6.144	2.287	1.822
1986	3.082	2.301	1.572	1.690	2.223	3.299	5.655	2.558	2.216
1987	3.024	2.392	1.850	1.530	2.752	2.953	5.673	2.606	2.203
1988	3.101	2.622	1.160	1.589	3.102	3.423	5.723	2.756	1.920
1989	3.205	2.708	1.848	1.494	3.047	4.098	5.920	2.968	1.791
1990	3.370	3.006	1.666	1.547	3.165	4.414	6.396	2.942	2.055
1991	3.583	3.575	1.760	1.872	3.729	4.125	6.291	3.661	2.371
1992	3.633	3.307	1.865	1.914	3.016	4.045	6.301	2.897	2.902
1993	3.020	2.862	1.568	1.302	2.225	4.328	6.240	1.980	2.378
1994	3.193	2.519	1.243	1.373	2.001	3.811	6.582	3.434	2.407
1995	3.229	2.999	1.438	1.511	2.998	2.961	6.674	2.694	2.450
1996	3.436	3.642	1.756	1.735	2.800	3.324	6.248	3.584	2.604
1997	3.540	3.421	2.201	0.670	3.160	3.474	6.914	3.480	2.901
1998	3.353	3.127	1.714	1.700	3.148	3.356	6.819	2.360	2.886

Source: FAO/USDA

Table A.3.4 Cigarettes – exports ('000 tonnes)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998	1999
World	**158**	**336**	**739**	**817**	**927**	**978**	**1074**	**1049**	**926**	**944**
Developed	**142**	**308**	**533**	**526**	**600**	**634**	**693**	**703**	**641**	**683**
North America	*30*	*80*	*188*	*214*	*225*	*235*	*246*	*218*	*203*	*202*
United States	29	79	183	196	220	231	244	217	201	200
Europe	*111*	*225*	*331*	*287*	*329*	*341*	*399*	*441*	*408*	*445*
EU (15)	*39*	*134*	*246*	*227*	*243*	*230*	*295*	*360*	*340*	*367*
France	4	4	6	7	8	9	11	15	15	16
Germany	5	36	82	82	92	80	93	81	89	107
Greece	0	0	9	8	7	13	22	21	14	16
Netherlands	7	32	78	56	86	89	107	112	104	113
United Kingdom	21	42	47	44	16	13	32	94	82	73
Other Europe										
Bulgaria	50	65	54	23	40	61	40	26	15	20
Poland	2	0	2	4	5	3	4	5	5	5
Romania	0	0	0	0	0	0	0	0	0	0
Area of the former USSR	*1*	*1*	*3*	*9*	*27*	*37*	*31*	*27*	*14*	*18*
Oceania	*1*	*0*	*1*	*1*	*1*	*1*	*3*	*3*	*4*	*4*
Other developed										
Japan	0	1	10	15	15	18	12	13	11	14
Developing	**16**	**27**	**206**	**291**	**327**	**344**	**381**	**346**	**285**	**261**
Africa	*0*	*0*	*4*	*5*	*6*	*5*	*6*	*7*	*0*	*0*
Latin America	*2*	*2*	*37*	*53*	*83*	*96*	*112*	*126*	*123*	*97*
Brazil	1	1	19	34	58	63	80	87	87	63
Near East	*1*	*11*	*16*	*28*	*24*	*28*	*36*	*36*	*16*	*17*
Turkey	0	0	2	4	0	3	11	12	9	10
Far East	*9*	*12*	*149*	*205*	*214*	*216*	*228*	*178*	*143*	*144*
China, Mainland	0	0	19	42	54	63	59	25	23	23
India	1	3	2	2	1	1	2	2	1	1
Singapore	1	2	33	54	54	50	59	70	53	59

Source: USDA

Table A.3.5 Cigars – exports ('000 tonnes)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998
World	**10.7**	**9.1**	**41.3**	**16.4**	**15.5**	**14.1**	**17.7**	**22.2**	**25.1**
Developed	**9.4**	**5.1**	**10.0**	**12.5**	**11.3**	**10.6**	**12.2**	**15.2**	**17.7**
North America	*0.5*	*0.0*	*2.5*	*2.1*	*2.3*	*2.3*	*3.7*	*5.1*	*5.2*
Canada	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1
United States	0.5	0.0	2.4	2.1	2.3	2.3	3.6	5.1	5.1
Europe	*8.9*	*5.1*	*7.4*	*9.8*	*8.1*	*8.2*	*8.2*	*9.7*	*12.1*
EU (15)	*8.2*	*5.0*	*7.2*	*9.5*	*7.3*	*8.1*	*8.0*	*9.5*	*10.5*
Belgium-Luxembourg	3.4	4.2	3.2	4.1	3.3	3.8	4.0	4.1	4.8
Netherlands	4.0	0.0	2.9	4.2	2.9	2.8	2.6	3.8	3.6
Other Europe									
Switzerland	0.7	0.1	0.0	0.0	0.0	0.1	0.1	0.1	1.6
Yugoslav SFR	0	0.0	0.0						
Area of the former USSR	*0.0*	*0.0*	*0.0*	*0.6*	*0.9*	*0.1*	*0.3*	*0.3*	*0.2*
Estonia	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2
Russian Fed	0.0	0.0	0.0	0.0	0.9	0.1	0.1	0.1	0.0
Oceania	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*
Other developed	*0.0*	*0.0*	*0.1*	*0.0*	*0.0*	*0.0*	*0.0*	*0.1*	*0.1*
Developing	1.4	4.0	31.4	**3.9**	**4.2**	**3.5**	**5.5**	**7.0**	**7.4**
Africa	*0.0*	*0.2*	*0.6*	*0.0*	*0.0*	*0.1*	*0.0*	*0.1*	*0.0*
Latin America	*1.2*	*2.6*	*28.0*	*1.8*	*2.8*	*2.4*	*4.7*	*5.9*	*6.7*
Brazil	0.2	1.0	22.9	0.0	0.0	0.0	0.0	0.1	0.0
Cuba	0.6	0.8	1.1	0.5	0.7	1.0	0.4	0.5	0.5
Dominican Rep.	0.0	0.0	0.2	0.2	0.2	0.4	0.5	0.6	0.6
Honduras	0.1	0.4	1.5	0.7	1.7	0.5	2.7	2.6	2.2
Mexico	0.3	0.0	0.7	0.1	0.1	0.2	0.3	0.5	0.3
Nicaragua	0.0	0.0	0.0	0.0	0.0	0.1	0.5	1.3	2.7
Near East	*0.0*	*0.4*	*0.5*	*0.0*	*0.0*	*0.0*	*0.1*	*0.1*	*0.1*
Far East	*0.1*	*0.8*	*2.3*	*2.1*	*1.4*	*1.0*	*0.7*	*0.9*	*0.6*
Cambodia	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2
China, Mainland	0.0	0.0	0.6	0.7	0.1	0.0	0.0	0.0	0.0
India	0.1	0.6	1.3	1.0	1.0	0.8	0.1	0.1	0.1
Indonesia	0.0	0.0	0.0	0.1	0.1	0.0	0.2	0.3	0.1

Source: USDA

Table A.3.6 Other tobacco – exports (1000 Mt)

	1970	1980	1990	1991	1992	1993	1994	1995	1996	1997	1998
World	**54.1**	**76.0**	**77.2**	**81.5**	**182.5**	**167.4**	**210.3**	**272.2**	**277.2**	**300.9**	**330.2**
Developed	**50.7**	**63.1**	**77.2**	**81.5**	**155.5**	**134.8**	**171.4**	**183.3**	**233.2**	**251.9**	**271.0**
North America	*18.7*	*8.6*	*0.0*	*0.0*	*61.5*	*54.4*	*68.7*	*81.4*	*89.3*	*89.4*	*105.7*
Canada	7.3	0.1	0.0	0.0	3.1	4.5	2.8	4.2	5.8	3.5	0.4
United States	11.4	8.5	0.0	0.0	58.4	49.9	65.9	77.2	83.5	85.9	105.3
Europe	*31.1*	*52.1*	*77.2*	*81.5*	*87.4*	*75.4*	*72.7*	*80.3*	*103.0*	*121.9*	*130.8*
EU (15)	*21.1*	*51.1*	*77.2*	*81.5*	*84.0*	*70.6*	*68.2*	*74.2*	*84.2*	*105.7*	*108.2*
Belgium-Luxembourg	0.7	1.5	5.4	6.7	4.3	4.4	4.9	4.5	7.7	8.5	9.0
Denmark	0.8	2.5	1.6	1.6	1.8	1.8	1.9	1.8	1.8	1.7	2.0
France	6.0	26.6	19.6	26.9	26.1	8.6	9.3	9.3	10.9	17.5	20.4
Germany	0.0	0.0	9.3	7.6	9.0	7.8	8.2	12.9	16.4	22.7	22.8
Greece	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.5	1.8
Ireland	2.4	2.6	3.0	3.7	3.5	3.5	3.8	3.3	3.8	3.3	3.2
Netherlands	7.6	11.5	23.7	16.0	16.9	28.6	29.5	33.0	29.8	28.2	24.7
United Kingdom	2.9	4.2	14.2	18.1	19.8	12.0	7.4	7.3	11.5	21.3	22.8
Other Europe											
Norway	0.4	0.4	0.0	0.0	0.8	0.7	0.5	0.3	0.5	1.2	2.9
Poland	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.4	1.8	2.5
Switzerland	0.2	0.3	0.0	0.0	0.3	1.0	1.7	2.5	4.1	4.7	5.6
Area of the former USSR					*2.2*	*1.0*	*25.7*	*18.8*	*39.9*	*39.1*	*33.4*
Oceania	*0.2*	*1.4*	*0.0*	*0.0*	*0.6*	*0.6*	*0.9*	*0.8*	*0.7*	*1.3*	*1.0*
Australia	0.1	1.2	0.0	0.0	0.6	0.6	0.9	0.8	0.6	1.1	0.9
New Zealand	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1
Other Developed	*0.1*	*0.0*	*0.0*	*0.0*	*3.8*	*3.4*	*3.4*	*2.0*	*0.3*	*0.2*	*0.1*
South Africa	0.0	0.0	0.0	0.0	3.3	2.2	2.9	2.0	0.3	0.2	0.1
Developing	**3.4**	**12.9**	**0.0**	**0.0**	**27.0**	**32.6**	**38.9**	**88.9**	**44.0**	**49.0**	**59.2**
Africa	*0.3*	*0.3*	*0.0*	*0.0*	*1.9*	*2.8*	*2.7*	*2.5*	*3.5*	*4.2*	*4.6*
Tunisia	0.0	0.1	0.0	0.0	0.4	0.6	0.8	0.8	0.8	1.0	1.6
Zimbabwe	0.0	0.0	0.0	0.0	1.3	1.9	1.4	1.3	2.3	1.8	2.0
Latin America	*0.3*	*0.6*	*0.0*	*0.0*	*3.5*	*7.3*	*5.3*	*4.4*	*6.2*	*9.8*	*12.4*
Brazil	0.0	0.3	0.0	0.0	1.7	2.0	2.2	1.6	2.6	3.6	5.1
Dominican Rep.	0.0	0.1	0.0	0.0	1.0	1.7	1.5	1.3	1.3	1.4	1.4
Venezuela	0.0	0.0	0.0	0.0	0.5	0.6	0.9	1.1	1.2	3.4	2.9
Near East	*0.2*	*0.1*	*0.0*	*0.0*	*1.5*	*2.6*	*9.6*	*52.7*	*2.4*	*5.0*	*3.0*
Turkey	0.0	0.0	0.0	0.0	0.1	2.3	9.3	52.5	2.1	4.9	2.9
Far East	*2.6*	*11.9*	*0.0*	*0.0*	*20.1*	*19.9*	*21.3*	*29.3*	*31.9*	*30.0*	*39.2*
China, Mainland	0.0	0.0	0.0	0.0	1.1	4.0	7.1	8.9	8.1	6.2	5.6
India	2.0	9.3	0.0	0.0	13.0	9.8	8.4	7.4	7.5	7.5	20.0
Indonesia	0.0	0.0	0.0	0.0	0.2	1.1	0.5	1.3	1.8	0.6	1.1
Malaysia	0.2	0.0	0.0	0.0	1.2	2.0	2.1	3.4	8.7	8.7	4.3
Pakistan	0.0	2.6	0.0	0.0	2.5	1.2	1.0	1.1	1.3	1.2	1.6
Singapore	0.1	0.0	0.0	0.0	1.5	1.0	1.1	1.7	3.2	4.4	5.9

Source: USDA

IMPORTS

Table A.4.1 Tobacco leaf – imports (1000 Mt)

	1970-72	1980-82	1990-92	1 993	1 994	1 995	1 996	1 997	1 998	1 999
World	962.2	1 300.8	1 641.5	1 702.5	1 811.7	1 746.2	2 006.0	2 062.1	2 050.7	2 062.0
Developed	747.8	1 029.4	1 401.2	1 354.9	1 447.0	1 361.8	1 595.8	1 603.1	1 628.5	1 641.3
North America	113.7	230.3	267.6	369.6	276.8	210.8	341.5	325.4	262.3	244.4
United States	111.7	225.8	263.5	359.7	264.4	199.1	326.5	306.8	246.8	241.1
Europe	481.2	589.8	938.1	710.2	816.0	797.4	923.4	888.0	965.1	905.9
EU (15)	397.3	483.6	808.8	577.4	656.0	643.7	738.7	698.8	396.8	295.1
Germany	160.2	181.1	180.4	153.6	182.6	173.2	184.6	174.7	171.5	189.7
Netherlands	58.1	88.0	95.0	73.7	87.8	87.3	96.9	116.0	99.6	112.6
Spain	59.7	71.4	69.3	44.7	53.5	48.4	52.8	55.6	61.2	53.9
United Kingdom	91.8	130.7	132.0	111.6	124.8	134.3	177.6	145.8	236.0	128.6
Other Europe	*0.0*	*0.0*	*129.3*	*132.9*	*160.1*	*153.7*	*184.7*	*189.3*	*182.3*	*31.5*
Switzerland	33.3	24.9	30.6	27.6	38.0	37.0	41.8	38.0	34.9	31.5
Area of the former USSR	77.4	104.1	34.2	125.0	184.4	204.4	202.0	254.5	257.5	361.5
Oceania	16.4	14.8	13.1	13.2	14.1	16.2	18.8	18.0	14.7	18.3
Other developed	59.2	90.5	124.4	136.7	155.8	132.9	110.1	117.4	128.9	124.9
Japan	47.2	77.3	99.5	118.7	135.5	115.1	85.6	98.4	101.4	98.9
Developing	214.4	271.4	354.2	347.6	364.6	384.4	410.2	459.0	422.2	420.7
Africa	57.5	49.7	52.4	55.7	62.5	59.6	52.1	51.2	62.7	58.6
Latin America	42.2	22.5	40.7	49.1	46.3	56.2	69.7	75.5	86.9	63.8
Near East	26.1	60.4	79.9	76.5	79.1	85.6	110.3	123.3	114.6	122.1
Egypt	15.8	33.3	45.8	44.1	47.7	48.3	53.1	53.8	54.7	55.0
Turkey	0.0	0.0	11.7	12.5	16.7	21.6	43.0	54.4	42.2	48.8
Far East	87.2	137.8	180.0	165.6	175.9	182.2	177.7	208.2	158.0	179.7
China, Mainland	8.7	43.9	31.9	31.1	16.8	8.6	13.6	15.1	6.7	10.5
India	0.1	0.0	0.1	0.1	0.1	0.4	0.4	0.2	2.6	1.5
Indonesia	10.9	19.4	26.7	30.2	40.3	48.0	45.1	47.1	17.2	40.9
Thailand	10.7	10.4	8.3	7.5	9.3	9.5	10.0	10.2	10.6	10.2

Source: FAO

Table A.4.2 Tobacco leaf – import value (million $)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998	1999
World	**1 546**	**4 493**	**6 314**	**5 972**	**6 235**	**6 113**	**7 283**	**7 925**	**7 480**	**7 340**
Developed	**1 360**	**3 675**	**5 105**	**4 794**	**5 029**	**4 764**	**5 676**	**6 010**	**5 807**	**5 821**
North America	*123*	*447*	*934*	*1 025*	*764*	*607*	*1 135*	*1 217*	*849*	*793*
United States	119	431	923	1 002	740	582	1 097	1 170	811	782
Europe	*987*	*2 400*	*3 352*	*2 867*	*3 185*	*3 159*	*3 572*	*3 633*	*3 661*	*3 690*
EU (15)	*862*	*2 098*	*2 968*	*2 430*	*2 692*	*2 669*	*2 957*	*2 912*	*2 927*	*2 933*
Belgium-Luxembourg	48	125	204	181	199	222	224	190	184	173
France	46	74	122	113	132	121	115	89	102	108
Germany	245	584	788	681	724	739	742	705	739	839
Greece	0	21	77	83	77	98	126	99	89	103
Italy	36	118	170	116	112	131	134	171	170	169
Netherlands	78	290	479	373	436	471	461	526	497	555
Spain	51	238	330	224	282	263	297	309	337	303
United Kingdom	255	433	509	392	430	415	636	592	552	432
Other Europe	***87***	***190***	***258***	***350***	***419***	***428***	***539***	***619***	***633***	***644***
Bulgaria	11	46	21	18	16	23	33	29	34	34
Czech Rep				32	46	58	87	132	121	78
Hungary	7	17	28	41	56	44	58	67	68	63
Poland	5	25	52	98	126	142	155	185	184	228
Romania	3	2	3	17	10	5	22	36	64	84
Switzerland	61	101	154	144	164	155	183	170	162	157
Area of the former USSR	*113*	*334*	*135*	*163*	*254*	*241*	*329*	*457*	*582*	*679*
Russian Fed				28	77	108	131	177	308	416	510
Ukraine				18	48	109	76	103	94	104	98
Oceania	*30*	*68*	*63*	*67*	*75*	*104*	*96*	*82*	*66*	*77*
Other Developed	*107*	*427*	*621*	*673*	*751*	*653*	*544*	*622*	*649*	*582*
Japan	95	385	537	611	687	585	474	552	566	547
Developing	**186**	**819**	**1 209**	**1 178**	**1 206**	**1 350**	**1 607**	**1 915**	**1 673**	**1 519**
Africa	*37*	*125*	*138*	*140*	*167*	*153*	*147*	*142*	*179*	*159*
Algeria	3	38	20	45	73	45	15	16	34	36
Morocco	4	16	20	14	17	14	24	19	19	21
Tunisia	1	10	17	20	14	17	18	22	31	20
Latin America	*21*	*81*	*124*	*136*	*112*	*150*	*211*	*258*	*302*	*170*
Argentina	0	2	4	13	8	20	22	23	15	17
Brazil	0	1	20	26	28	51	52	70	51	7
Mexico	0	0	55	40	16	6	10	32	39	33
Near East	*33*	*174*	*288*	*314*	*313*	*358*	*481*	*537*	*478*	*469*
Egypt	19	93	114	128	142	134	146	128	149	161
Turkey	0	0	75	94	86	134	240	341	255	248
Far East	*92*	*430*	*654*	*585*	*609*	*686*	*765*	*975*	*712*	*719*
China, Mainland	3	90	61	51	28	29	61	84	35	52
Indonesia	2	29	55	77	100	115	134	158	76	128
Korea Rep.	4	50	54	46	54	75	105	96	86	87
Malaysia	10	26	36	35	36	51	63	110	74	90
Philippines	7	43	77	57	94	91	64	121	86	106
Singapore	8	16	60	43	64	68	76	87	55	30
Thailand	22	54	52	51	61	59	57	53	73	73

Source: FAO

Table A.4.3 Cigarettes – imports ('000 tonnes)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998	1999
World	120.6	273.6	566.5	662.7	724.2	735.7	718.1	684.6	683.8	641.2
Developed	87	180	361	408	456	472	445	439	483	432
North America	0	1	6	18	4	4	5	5	7	11
United States	0	1	6	17	4	3	4	4	6	11
Europe	33	105	208	243	280	261	243	241	275	263
EU (15)	24	92	171	188	235	208	199	202	244	231
Belgium-Luxembourg	2	3	5	9	11	12	9	9	10	17
France	5	26	51	67	61	58	54	61	60	63
Germany	5	8	11	9	12	17	14	27	29	26
Greece	0	1	6	9	11	12	12	11	13	12
Italy	5	28	35	38	42	39	39	41	43	51
Netherlands	2	16	17	15	20	18	20	19	19	17
Spain	5	4	27	18	18	27	23	10	15	22
United Kingdom	1	3	17	18	53	19	18	16	45	13
Other Europe										
Romania	0	0	6	15	15	21	12	8	7	6
Yugoslavia			2	8	13	14	15	17	15	15
Area of the former USSR	49	66	89	85	101	132	117	112	117	71
Oceania	1	1	1	1	1	1	1	1	1	2
Other Developed	4	7	58	62	70	75	81	81	84	86
Japan	2	5	55	59	67	72	77	78	81	83
Developing	34	94	205	255	268	263	273	246	201	209
Africa	6	14	20	21	21	23	22	21	19	19
Latin America	4	5	22	20	21	23	24	25	23	21
Near East	11	56	62	65	65	69	63	65	46	46
Saudi Arabia	5	19	19	20	20	20	20	20	20	20
Far East (Asia and Pacific)	12	18	99	147	161	148	162	134	113	123
China, Mainland	0	0	8	11	0	13	18	7	3	3
Korea Rep.	0	0	5	7	8	12	12	12	5	7
Singapore	2	3	26	47	45	38	47	58	45	49

Source: USDA

Table A.4.4 Cigars – Imports (1000 Mt)

	1970-72	1980-82	1990-92	1993	1994	1995	1996	1997	1998
World	**10.1**	**9.6**	**39.8**	**21.9**	**22.7**	**18.7**	**25.7**	**26.6**	**24.8**
Developed	**8.6**	**7.5**	**13.6**	**18.3**	**20.2**	**15.6**	**17.9**	**19.0**	**17.0**
North America	*0.5*	*0.0*	*1.3*	*1.5*	*1.8*	*2.4*	*4.0*	*7.2*	*6.0*
United States	0.4	0.0	1.3	1.5	1.8	2.4	3.9	7.0	5.8
Europe	*7.7*	*7.1*	*11.3*	*13.3*	*14.0*	*11.6*	*12.5*	*10.6*	*10.2*
EU (15)	*7.4*	*6.9*	*10.9*	*12.7*	*13.6*	*11.1*	*12.0*	*8.7*	*9.8*
Belgium-Luxembourg	1.8	2.9	1.1	2.1	1.0	0.8	0.7	0.9	1.1
France	0.6	1.7	1.4	1.6	3.2	2.1	2.5	1.4	1.7
Germany	0.0	0.0	0.5	0.5	0.5	0.7	0.5	0.7	0.8
Netherlands	3.2	0.0	3.0	3.3	4.3	3.5	3.8	3.8	4.3
Other Europe									
Czech Rep	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2
Area of the former USSR	*0.0*	*0.0*	*0.7*	*3.3*	*4.2*	*1.4*	*1.2*	*1.0*	*0.6*
Estonia	0.0	0.0	0.0	0.1	0.2	0.0	0.2	0.2	0.2
Russian Fed	0.0	0.0	0.7	3.1	4.0	1.2	0.8	0.8	0.1
Oceania	*0.1*	*0.2*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
Other developed	*0.3*	*0.2*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
Developing	**1.5**	**2.1**	**26.1**	**3.6**	**2.5**	**3.1**	**7.8**	**7.6**	**7.8**
Africa	*0.0*	*0.0*	*0.7*	*0.8*	*0.8*	*1.1*	*1.3*	*1.1*	*0.9*
Mauritania	0.0	0.0	0.3	0.6	0.5	0.5	0.5	0.5	0.5
Latin America	*0.2*	*1.9*	*23.8*	*0.3*	*0.7*	*0.3*	*0.8*	*0.9*	*1.5*
Brazil	0.2	1.9	23.5	0.0	0.5	0.1	0.1	0.1	0.1
Paraguay	0.0	0.0	0.1	0.0	0.1	0.1	0.5	0.5	0.5
Near East	*1.3*	*0.2*	*0.6*	*0.9*	*0.2*	*0.2*	*0.3*	*0.3*	*0.5*
Far East	*0.0*	*0.0*	*1.0*	*1.6*	*0.8*	*1.5*	*5.4*	*5.3*	*4.9*
Bangladesh	0.0	0.0	0.0	0.0	0.0	0.5	0.4	0.3	0.1
Cambodia	0.0	0.0	0.0	0.0	0.0	0.0	4.5	4.5	4.5
United Arab Emirates	0.0	0.0	0.4	0.5	0.1	0.1	0.1	0.1	0.1

Source: USDA

Table A.4.5 Other tobacco – imports ('000 tonnes)

	1970	1980	1990	1991	1992	1993	1994	1995	1996	1997	1998
World	**22.1**	**65.5**	**88.3**	**82.4**	**152.1**	**132.4**	**141.7**	**167.1**	**186.6**	**214.1**	**233.6**
Developed	**18.7**	**52.4**	**88.3**	**82.4**	**103.6**	**94.3**	**99.1**	**109.6**	**128.3**	**145.2**	**158.4**
North America	*4.7*	*15.0*	*0.0*	*0.0*	*6.2*	*6.1*	*3.2*	*3.9*	*3.5*	*4.0*	*4.6*
Canada	0.9	1.0	0.0	0.0	2.2	1.9	1.1	1.4	1.8	1.5	1.6
United States	3.8	14.0	0.0	0.0	4.0	4.2	2.1	2.5	1.7	2.5	3.0
Europe	*12.3*	*35.6*	*88.3*	*82.4*	*93.3*	*83.1*	*85.5*	*95.2*	*104.4*	*115.2*	*126.8*
EU (15)	*10.6*	*33.0*	*88.3*	*82.4*	*83.2*	*72.5*	*72.8*	*83.3*	*86.7*	*96.4*	*110.0*
Austria	0.2	0.1	0.0	0.0	0.6	0.6	1.2	1.4	1.6	1.9	2.2
Belgium-Luxembourg	1.9	4.8	11.1	11.8	10.4	9.0	6.3	8.1	9.5	14.9	15.5
France	1.0	2.2	16.4	2.1	2.9	3.6	4.1	4.3	5.5	6.9	10.6
Germany	0.0	0.0	28.2	31.5	31.4	26.6	27.3	25.8	25.6	27.9	30.6
Greece	0.0	0.0	0.8	1.1	1.5	1.3	0.9	2.0	1.2	1.1	1.8
Ireland	2.5	3.7	2.9	3.7	3.8	3.9	4.8	4.7	5.6	4.6	3.8
Italy	0.2	0.4	1.3	1.0	1.3	0.9	1.8	3.1	3.2	3.1	3.9
Netherlands	0.6	8.3	14.4	14.3	14.9	12.1	14.8	16.8	15.0	17.9	18.7
Portugal	0.0	0.0	0.0	0.5	0.3	0.0	0.0	0.1	0.1	1.0	2.8
Spain	0.1	2.6	2.6	5.0	2.1	3.8	2.5	3.3	2.2	3.4	4.5
United Kingdom	2.7	9.2	10.2	11.3	11.8	8.7	7.5	12.3	16.1	12.4	14.6
Other Europe											
Czech Rep	0.0	0.0	0.0	0.0	0.0	1.3	2.0	1.1	3.2	4.3	3.8
Hungary	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.6	1.4	1.5	0.9
Malta	0.5	1.0	0.0	0.0	0.4	0.7	1.3	1.2	0.9	0.8	0.8
Poland	0.0	0.0	0.0	0.0	1.7	1.9	1.9	1.5	0.9	2.3	1.9
Romania	0.0	0.0	0.0	0.0	0.4	0.1	0.2	0.7	2.8	1.3	0.0
Switzerland	0.9	1.4	0.0	0.0	2.9	4.1	3.4	3.8	4.2	3.3	3.9
Area of the former USSR					*2.6*	*3.7*	*8.8*	*8.8*	*18.8*	*24.5*	*25.3*
Kazakhstan	0.0	0.0	0.0	0.0	0.0	0.0	1.1	1.8	7.0	9.6	6.8
Lithuania	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.4	2.5	3.2
Russian Fed	0.0	0.0	0.0	0.0	1.2	1.5	6.5	5.4	9.6	9.6	12.4
Oceania developed	*1.5*	*1.4*	*0.0*	*0.0*	*1.1*	*1.1*	*1.2*	*1.2*	*1.3*	*1.1*	*0.9*
Australia	1.5	1.4	0.0	0.0	1.0	1.0	1.2	1.1	1.2	1.0	0.8
Other developed	*0.2*	*0.4*	*0.0*	*0.0*	*0.4*	*0.3*	*0.4*	*0.5*	*0.3*	*0.4*	*0.8*
Developing	**3.4**	**13.1**	**0.0**	**0.0**	**48.5**	**38.1**	**42.6**	**57.5**	**58.3**	**68.9**	**75.2**
Africa	*0.7*	*1.0*	*0.0*	*0.0*	*7.3*	*6.2*	*7.4*	*7.7*	*6.3*	*6.4*	*6.5*
Algeria	0.0	0.6	0.0	0.0	0.0	0.0	0.7	2.8	1.4	1.3	1.3
Lesotho	0.0	0.0	0.0	0.0	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Latin America	*1.0*	*1.4*	*0.0*	*0.0*	*3.2*	*3.6*	*4.9*	*5.8*	*7.5*	*10.7*	*11.6*
Brazil	0.0	0.0	0.0	0.0	1.6	1.9	2.8	4.0	5.0	7.7	7.8
Near East	*0.2*	*9.9*	*0.0*	*0.0*	*28.8*	*18.1*	*17.0*	*23.8*	*26.8*	*34.1*	*41.0*
Cyprus	0.0	0.0	0.0	0.0	3.8	1.7	1.0	1.4	1.2	2.5	2.6
Egypt	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.5	1.7	2.2	4.9
Saudi Arabia	0.1	8.3	0.0	0.0	13.7	8.1	3.6	9.2	9.2	12.0	12.0
Sudan	0.0	0.0	0.0	0.0	1.5	1.2	1.2	1.6	2.0	2.1	2.1
Turkey	0.0	0.0	0.0	0.0	2.2	3.5	4.9	4.7	6.9	10.3	14.9
Far East	*1.4*	*0.8*	*0.0*	*0.0*	*8.0*	*9.1*	*12.0*	*19.3*	*16.7*	*16.5*	*15.0*
Indonesia	0.0	0.0	0.0	0.0	1.5	2.6	2.5	4.1	4.6	4.9	2.6
Malaysia	0.6	0.2	0.0	0.0	2.0	1.1	1.0	3.8	1.7	2.8	1.2
Viet Nam	0.0	0.0	0.0	0.0	0.4	0.4	1.5	3.2	5.4	3.5	6.8
Oceania developing	*0.1*	*0.0*	*0.0*	*0.0*	*1.2*	*1.1*	*1.3*	*0.9*	*1.0*	*1.2*	*1.1*

Source: USDA

ANNEX B. METHODOLOGICAL ANNEX

1   Introduction

This annex documents the methodology used in deriving the projections.

The module on production of tobacco leaf includes tobacco area and tobacco yield equations that determine domestic production. The impact and significance of various factors such as tobacco leaf price at farm level, technology, irrigation, possible competition with other crops, tobacco types, etc., are examined and their importance in modelling is considered. Stocks are not considered in detail but as a balancing item.

The demand for tobacco leaf is usually modelled as a function of income, price, population of age 15 and above, and a vector of shift variables that include learning, preferences, anti-smoking measures, advertising, etc.

Import and export demand functions are estimated and linked to the world price through price transmission equations. The world price is a weighted average of the unit values of exports from the four major exporters.

The model closes with trade using excess supply and excess demand functions for each country and for the world, balancing excess supply and excess demand and revising the world price appropriately.

2   A Standard Commodity Model

A standard commodity model can be specified either in linear or in logarithmic form as follows. The model is specified in A in linear form and in B in logarithmic form (double log). The model has 7 equations with 7 endogenous variables, six exogenous variables and 18 parameters. The model can be specified as a simultaneous or a recursive model. In this study it is specified as a recursive model.

A.   Commodity model in linear form

(1) $A_t = a_0 + a_1 P_t^c + a_2 P_{t-1}^0 + a_3 T + a_4 A_{t-1}$

(2) $Y_t = \beta_0 + \beta_1 T$

(3) $S_t = A_t * Y_t$

(4) $D_t = \gamma_0 + \gamma_1 P_t^c + \gamma_2 E + \gamma_3 N + \gamma_4 T + \gamma_5 D_{t-1}$

(5) $X_t = \delta_0 + \delta_1 \dfrac{P_w}{P_x} + \delta_2 SSR_t + \delta_3 X_{t-1}$

(6) $M_t = \delta_0^* + \delta_1^* P_M + \delta_2^* SSR_t + \delta_3^* M_{\tau-1}$

(7) $I_t = I_{t-1} + S_t - D_t - X_t$

B.   Commodity model in double log form

(1) $\ln A_t = a_0 + a_1 \ln P_t^c + a_2 \ln P_{t-1}^0 + a_3 \ln T + a_4 \ln A_{t-1}$

(2) $\ln Y_t = \beta_0 + \beta \ln T$

(3) $\ln S_t = \ln A_t * \ln Y_t$

(4) $\ln D_t = \gamma_0 + \gamma_1 \ln P_1^c + \gamma_2 \ln E + \gamma_3 \ln N + \gamma_4 \ln T + \gamma_5 \ln D_{t-1}$

(5) $\ln X_t = \delta_0 + \delta_1 \ln \dfrac{P_w}{P_X} + \delta_2 \ln(SSR_t) + \delta_3 \ln X_{t-1}$

(6) $\ln M_t = \delta_0^* + \delta_1^* \ln P_M + \delta_2^* \ln SSR_t + \delta_3^* \ln M_{t-1}$

(7) $I_t = I_{t-1} + S_t - D_t - X_t$

Endogenous Variables

A_t :   area

Y_t :   yield

D_t :   demand

X_t :   exports

P^c :   price of commodity

I_t :   ending stocks

S_t :   supply

Exogenous Variables

P^w :   world price

P^0 :   price index of other commodities

T :   time trend (technology index)

E :   private expenditure (GDP)

N :   population

Z :   demand shifters

SSR: Self-Sufficiency Ratio

P_M: Border price of imports

$\dfrac{P_w}{P_x}$:   World price in the world market relative to the domestic price

3   Model specification and data

Given the large number of countries for which the model was estimated and the fact that the results were to be used in a projections model, we made a choice for a standard model specification in all countries and regions. This does not allow much flexibility in modelling production supply and consumption taxation regimes across countries that are quite different from one country to another. However, the double log specification is very convenient and suitable for such an extensive estimation effort that includes all countries of the world.

The data used in the estimation are from various sources, including USDA and FAO and are summarized in the Statistical Annex A. This data set does not include information on prices, either tobacco leaf prices (farm level) or consumption prices. Some information on prices was available for certain countries and is given in Table B.1.

Table B.1 Farm level prices (US$/kg)

Year	Average prices			
	Malawi	**Zimbabwe**	**Turkey**	**United States**
1980	1.35			
1981	2.30			
1982	2.02			
1983	1.35			
1984	1.39	1.66		4.00
1985	1.22	1.86		3.66
1986	1.60	1.89		3.41
1987	1.79	1.59		3.48
1988	2.06	2.42		3.56
1989	1.67	2.02		3.69
1990	2.17	1.86		3.78
1991	2.56	2.28	4.13	3.87
1992	1.90	1.82	4.05	3.91
1993	1.21	1.24	4.33	3.86
1994	1.41	1.73	3.81	3.90
1995	1.66	2.12	2.97	4.03
1996	1.94	2.94	3.32	4.14
1997	1.72	2.33	3.47	3.98
1998	1.36	1.72	3.36	4.04

Source: USDA

For those countries for which information on farm level prices was not available we used a farm price index derived from the export unit value deflated appropriately. We used the dollar deflator to deflate prices to constant US dollars. The deflator used is given in Table B.2. No attempt was made to construct a consumption price, because of lack of suitable data, at the cost of not introducing a price variable in the estimation of demand functions.

Table B.2 US dollar deflator

Year	Deflator	Year	Deflator	Year	Deflator
1970	0.295	1980	0.581	1990	0.881
1971	0.310	1981	0.636	1991	0.913
1972	0.323	1982	0.675	1992	0.936
1973	0.341	1983	0.701	1993	0.958
1974	0.372	1984	0.728	1994	0.978
1975	0.407	1985	0.751	1995	1.000
1976	0.430	1986	0.767	1996	1.020
1977	0.458	1987	0.790	1997	1.038
1978	0.491	1988	0.817	1998	1.050
1979	0.532	1989	0.848		

Source: OECD

4   The methodology of projections

The projections were obtained following a methodology that essentially included three stages. The first stage included the construction of the model, the second stage included the calibration and validation of the model and the third stage included the simulations of the model that produced the projections. The endeavour was to base the projections as much as possible on an empirically estimated commodity model and on official forecasts for the exogenous variables for the simulations for the period up to 2010.

Undertaking an empirical estimation of the commodity model, however, for 164 countries would have been not only an impossible task, but also unnecessary. Thus, the model was estimated for the eight major countries that produce more than 80 percent of world tobacco leaf production and to a large

extent are major consumers as well. The remaining countries were then aggregated into regional groups.

Thus, in the first stage production, demand, export and import equations were estimated for the major producing countries: China, India, Brazil, the United States, the EU, Turkey, Zimbabwe and Malawi. In addition, the same set of equations was estimated for the following groups of countries, other Europe, area of the former USSR, Oceania, other developed, other Africa, other Latin America, other Near East and other Far East. The specification of the model is given in section 5 and the estimation results using data for the period 1970-1998 are provided in section 6.

In the second stage the simulation model was constructed in an Excel spreadsheet including the standard list of the total number of countries (164) and all regional groupings. The model consists of five equations in double log form, i.e., demand, area, yield, exports and imports. The three year average 1997-1999 ("1998") was used as base year of the model. Having estimated the model in double log form, these parameters are directly interpreted as elasticities which are constant throughout the data range and the projection period. These parameters were incorporated into the model.

In a limited number of cases the estimated parameters did not conform with a priori expectations from theory. One major constraint to improving the estimation results was that the functional forms were the same across countries to facilitate the construction of the model in a spreadsheet. In such cases where they had the wrong sign or magnitude they were replaced with parameters that are consistent with evidence available in the literature.

The most important of these cases is the lack of a price-related parameter in the estimated demand function. The inability to construct a consumption price for each country forced us to estimate simple Engel curves and introduce the respective price elasticities available from the literature directly as price parameters. Such could not be found at the country level and were assumed from evidence available (Zhang, 2000) to be -0.30 for developed countries and -0.80 for developing countries.

The model was calibrated to the base year ("1998") by adjusting the intercept.

The model was also validated by examining predictive ability for the period 1992-1997. The validation results show that variability at the country level was high and predictive ability at the country level was rather poor but adequate. One of the reasons is that, except for the major eight countries, the parameters estimated are obtained from regional data and thus may not conform with country level conditions. This implies that projections at the country level may not be good enough to capture all country details and peculiarities. When, however, it comes to the regional level (such as Africa, Latin America, etc) or the world level, the predictive ability is very good because of averaging out of projection inaccuracies at the country level.

In the third stage, the model that was constructed in the first stage, and calibrated in the second stage was used for simulating the period 1999-2010. The projections were obtained for each country of the standard country list, using the constructed model and official forecasts for the exogenous variables, such as GDP and population for each country.

In addition, the results were examined for consistency with a priori knowledge about the various countries and their production, demand and trade conditions. Such country knowledge was incorporated into the projection results using judgement and discretion for countries for which the country level studies were available, such as China, Turkey, India, Zimbabwe, Malawi, and also for EU and the United States for which some general information is available from other sources. The consistency of the projection results was examined mainly by comparing the net trade position projected by production and demand for main producing and trading countries with the results of the independently projected exports and imports.

5 Data sources and definitions used in the estimation of the commodity model

The model covers all major countries of the world. The standard country list used for the study is given in Annex A. It includes 164 countries grouped into developed and developing countries and further into the same regional groups as used in the analysis of past trends in Chapter 2. China is sometimes singled out because of its size.

Production data include tobacco leaf production in farm weight, as well as the area under tobacco in hectares and yield in farm weight for all countries of the world for the period 1970 to 2000. There are also detailed data by type of tobacco, such as Virginia, burley, etc. Consumption data are in dry weight for all countries of the standard country list. Similarly, there are export and import data (quantity and value) in dry weight for each country in the country list for the period 1970-1999.

Consumption and trade data are aggregate data providing no distinction between the various types of tobacco. Tobacco leaf consumption data at the country level are derived using a supply utilization account and data on stocks, production, imports and exports. Consumption data do not include 'on farm' consumption of home produced tobacco, which is believed to account for a substantial part of consumption in many developing countries.

Data on cigarette production and consumption exist for a number of countries, but they are incomplete. Therefore the analysis did not include cigarette demand and supply, but consumption of all tobacco products is translated into leaf equivalent. Thus, the analysis includes only one level (tobacco leaf).

The major deficiency of the data set and the study is the lack of price data. Price data at the farm level and for consumption are very scarce. There are several reasons explaining this deficiency. First, tobacco is a differentiated commodity with various tobacco types produced and traded. Countries and manufacturers buy particular types that they need to achieve the desired blend for the types of cigarettes they produce and therefore they may appear as both importers and exporters. Therefore, each price corresponds to a particular tobacco type, and prices of different tobacco types differ widely. Thus, there is no homogenous commodity called tobacco but various tobacco types traded internationally at prices that differ substantially.

Furthermore, there are substantial quality differences within each tobacco type. In addition, some leaf producing countries manufacture by direct contract so price data are not available, such as in Brazil. Producers in countries such as Zimbabwe and Malawi sell in auction markets and there are good price data for these countries. For Turkey also there are good price data maintained by the national tobacco monopoly. For the United States and the EU price data were obtained from other sources. For some other countries no price data are available for either production or consumption.

6 Estimation results

The estimation results used for deriving the parameters to construct the commodity model are presented in this section. The major problem in the estimation was the lack of price data. Because of lack of data for consumption, the demand equation was estimated as a simple Engel curve. The prices used in the area equation are the deflated tobacco average prices, while for the export supply and import demand functions we used the deflated export unit value and deflated import unit value, respectively. SSR is the self-sufficiency ratio and is the quotient of production over consumption.

The t-statistic for the estimated parameter is reported in the brackets. The period of the data used was from 1970 to 1998 and the model was estimated by OLS.

Given the uniform specification used and the lack of long time series for certain variables, the results are generally considered adequate. The statistical fit was generally good, although in some cases such as the yield equation, there are cases in which the statistical fit is low. However, the yields are usually responsive to uncertain situations, such as weather conditions and other short term influences. For the

purpose of this task the long term trend of the yields is adequate and therefore there was no price response specification for yields, but only a time trend was included.

The statistical significance of the estimated parameters was generally adequate, although there are several cases of low statistical significance or, worse, of wrong signs. We chose to report the results as they have been obtained to inform the reader. Some adjustments, however, were necessary as is generally the case for the construction of a model in order that it produces meaningful and operational results.

Some of the estimated import and export functions were problematic, in particular in cases where not much activity for imports or exports exists for the particular country. Again, in these cases some adjustments were made in the model so that parameters conform with theory, as is usually the case in a modelling exercise.

The statistical results for each country and for each group of countries are presented below.

United States

Area:	$\ln A_t =$	$4.661 +$ (1.98)	$0.303*\ln A_{t-1} +$ (1.415)	$1.333*\ln P_t +$ (2.176)	$0.699*\ln$ (2.512)	$R^2 = 0.59$
Yield:	$\ln Y =$	$0.807 +$ (2.4.35)	$0.014*\ln T$ (1.137)			$R^2 = 0.04$
Demand:	$\ln(D/N)=$	$3.830 -$ (-9.196)	$0.683*\ln(E/N)$ (-4.727)			$R^2 = 0.45$
Exports:	$\ln X_t =$	$4.577 +$ (4.518)	$0.208*\ln X_{t-1} +$ (1.183)	$0.249*\ln(SSR) +$ (1.328)	$0.433*\ln P_w/P_x$ (2.461)	$R^2 = 0.61$
Imports:	$\ln M_t =$	$1.901 +$ (2.286)	$0.668*\ln M_{t-1} -$ (5.026)	$0.209*\ln(SSR) -$ (-0.516)	$0.086*\ln P_M$ (-0.378)	$R^2 = 0.62$

EU

Area:	$\ln A_t =$	$0.395 +$ (0.447)	$0.859*\ln A_{t-1} +$ (10.49)	$0.220*\ln P_x$ (3.579)		$R^2 = 0.89$
Yield:	$\ln Y =$	$0.195 +$ (3.149)	$0.165*\ln T$ (6.920)			$R^2 = 0.63$
Demand:	$\ln(D/N) =$	$-7.200 +$ (-30.919)	$0.383*\ln(E/N) +$ (4.092)	$0.197*Dummy1 -$ (5.061)	$0.03*Dummy2$ (-0.928)	$R^2 = 0.74$
Exports:	$\ln X_t =$	$0.505 +$ (1.132)	$0.803*\ln X_{t-1} -$ (9.124)	$0.673*\ln(SSR) +$ (-1.804)	$0.415*\ln P_w/P_x$ (1.962)	$R^2 = 0.88$
Imports:	$\ln M_t =$	$3.263 +$ (3.296)	$0.526*\ln M_{t-1} -$ (4.184)	$0.438*\ln(SSR) -$ (-1.902)	$0.322*\ln P_M$ (-2.832)	$R^2 = 0.81$

Other Europe

Area:	$\ln A_t =$	$0.873 +$	$0.930 * \ln A_{t-1} +$	$0.038 * \ln P_X -$	$0.029 * \ln T -$	$0.25 * \text{Dummy}$	$R^2 = 0.96$
		(1.388)	(17.429)	(0.268)	(-1.124)	(-5.027)	
Yield:	$\ln Y =$	$0.059 +$	$0.055 * \ln T -$				$R^2 = 0.13$
		(0.852)	(2.072)				
Demand:	$\ln(D/N) =$	$7.243 +$	$1.360 * \ln(E/N) -$	$0.236 * \ln T$			$R^2 = 0.26$
		(-11.139)	(2.240)	(-2.820)			
Exports:	$\ln X_t =$	$4.142 +$	$0.107 * \ln X_{t-1} +$	$0.665 * \ln(SSR) +$	$0.745 * \ln P_W/P_X$		$R^2 = 0.88$
		(8.639)	(1.060)	(4.995)	(4.062)		
Imports:	$\ln M_t =$	$2.409 +$	$0.556 * \ln M_{t-1} -$	$0.342 * \ln(SSR) -$	$0.238 * \ln P_M$		$R^2 = 0.90$
		(4.194)	(5.147)	(-3.532)	(-2.421)		

Area of the former USSR

Area:	$\ln A_t =$	$5.708 +$	$0.486 * \ln A_{t-1} +$	$0.337 * \ln P_x$			$R^2 = 0.92$
		(5.205)	(5.079)	(6.196)			
Yield:	$\ln Y =$	$0.423 +$	$0.010 * \ln T$				$R^2 = 0.004$
		(5.402)	(0.345)				
Demand:	$\ln(D/N) =$	$-6.111 +$	$0.545 * \ln(E/N) -$	$0.29 * \ln T$			$R^2 = 0.44$
		(-46.128)	(2.373)	(-4.399)			
Exports:	$\ln X_t =$	$0.313 +$	$0.227 * \ln X_{t-1} -$	$0.226 * \ln(SSR) +$	$2.329 * \ln P_w/P_x$		$R^2 = 0.91$
		(1.726)	(1.967)	(-0.363)	(8.456)		
Imports:	$\ln M_t =$	$2.397 +$	$0.682 * \ln M_{t-1} -$	$0.195 * \ln(SSR) -$	$0.528 * \ln P_M -$	$0.019 * T$	$R^2 = 0.87$
		(3.907)	(5.854)	(-0.821)	(-4.387)	(-2.323)	

Other developed

Area:	$\ln A_t =$	$1.378 +$	$0.855 * \ln A_{t-1} +$	$0.196 * \ln P_X$			$R^2 = 0.95$
		(1.925)	(12.554)	(2.468)			
Yield:	$\ln Y =$	$0.059 +$	$0.056 * \ln T$				$R^2 = 0.13$
		(0.849)	(2.073)				
Demand	$\ln(D/N) =$	$-3.114 -$	$1.315 * \ln(E/N) +$	$0.114 * \ln T$			$R^2 = 0.91$
		(-9.853)	(-8.925)	(3.358)			
Exports:	$\ln X_t =$	$2.88 +$	$0.266 * \ln X_{t-1} -$	$0.638 * \ln(SSR) +$	$0.162 * \ln P_w/P_x -$	$0.18 * \ln T$	$R^2 = 0.25$
		(3.675)	(1.356)	(-1.696)	(0.537)	(-1.746)	
Imports:	$\ln M_t =$	$2.372 +$	$0.613 * \ln M_{t-1} -$	$0.086 * \ln(SSR) -$	$0.291 * \ln P_M$		$R^2 = 0.75$
		(3.481)	(5.002)	(-0.344)	(-1.365)		

Zimbabwe

Area: $\ln A_t =$ $1.105 +$ $0.903*\ln A_{t-1} +$ $0.023*\ln P_t$ $R^2 = 0.80$
         (0.620)   (5.891)   (0.138)

Yield: $\ln Y =$ $0.046 +$ $0.246*\ln T$ $R^2 = 0.80$
         (0.753)   (10.425)

Demand $\ln(D/N) =$ $-5.868 +$ $1.29*\ln(E/N) +$ $0.122*\ln T -$ $0.572*Dummy1$ $R^2 = 0.39$
         (-19.916)   (1.361)   (1.844)   (-3.589)

Exports: $\ln X_t =$ $0.491 +$ $0.918*\ln X_{t-1} -$ $0.071*\ln(SSR) +$ $0.244*\ln P_w/P_x$ $R^2 = 0.78$
         (0.862)   (8.136)   (-0.479)   (0.836)

Imports: $\ln M_t =$ $1.380 +$ $0.529*\ln M_{t-1} -$ $0.609*\ln(SSR) +$ $0.338*\ln P_M$ $R^2 = 0.42$
         (0.919)   (1.864)   (-0.748)   (0.742)

Malawi

Area: $\ln A_t =$ $8.722 +$ $0.268*\ln A_{t-1} -$ $0.482*\ln P_t +$ $0.306*Dummy1 -$ $0.218*Dummy2$ $R^2 = 0.65$
         (2.897)   (1.048)   (-2.563)   (2.370)   (-1.641)

Yield: $\ln Y =$ $-0.891 +$ $0.278*\ln T$ $R^2 = 0.70$
         (-9.933)   (8.063)

Demand $\ln(D/N) =$ $-5.863 +$ $1.034*\ln(E/N) +$ $0.550*\ln T$ $R^2 = 0.43$
         (-2.595)   (0.888)   (4.165)

Exports: $\ln X_t =$ $-0.043 +$ $0.936*\ln X_{t-1} +$ $0.182*\ln(SSR) +$ $0.145*\ln P_w/P_x$ $R^2 = 0.89$
         (-0.122)   (12.479)   (2.877)   (0.633)

Imports: $\ln M_t =$ $0.433 +$ $0.937*\ln M_{t-1} -$ $0.024*\ln(SSR) -$ $0.482*\ln P_M$ $R^2 = 0.61$
         (0.703)   (3.885)   (-0.097)   (-1.015)

Other Africa

Area: $\ln A_t =$ $2.214 +$ $0.813*\ln A_{t-1} +$ $0.004*\ln P_x$ $R^2 = 0.60$
         (1.332)   (5.847)   (0.120)

Yield: $\ln Y =$ $-0.568 +$ $0.082*\ln T$ $R^2 = 0.55$
         (-15.271)   (5.780)

Demand $\ln(D/N) =$ $-6.962 +$ $0.991*\ln(E/N) -$ $0.162*\ln T$ $R^2 = 0.70$
         (-22.908)   (2.244)   (-7.873)

Exports: $\ln X_t =$ $1.937 +$ $0.326*\ln X_{t-1} +$ $1.210*\ln(SSR) +$ $0.985*\ln P_w/P_x$ $R^2 = 0.79$
         (4.092)   (2.873)   (3.014)   (5.708)

Imports: $\ln M_t =$ $4.283 -$ $0.093*\ln M_{t-1} -$ $0.842*\ln(SSR) -$ $0.195*\ln P_M$ $R^2 = 0.49$
         (7.783)   (-0.734)   (-4.627)   (-1.296)

Brazil

Area:	$\ln A_t =$	$3.066 +$ (1.972)	$0.751*\ln A_{t-1} +$ (6.002)	$0.066*\ln P_x$ (1.348)	$R^2 = 0.66$
Yield:	$\ln Y =$	$-0.159 +$ (-3.341)	$0.185*\ln T$ (10.084)		$R^2 = 0.79$
Demand	$\ln(D/N) =$	$-6.502 -$ (-57.909)	$0.256*\ln(E/N)$ (1.426)		$R^2 = 0.07$
Exports:	$\ln X_t =$	$1.566 +$ (2.154)	$0.569*\ln X_{t-1} +$ (4.046)	$1.309*\ln(SSR_t) -$ (5.817) $0.167*\ln P_W/P_x$ (-0.853)	$R^2 = 0.85$
Imports:	$\ln M_t =$	$0.592 -$ (0.284)	$0.126*\ln M_{t-1} -$ (-0.362)	$1.004*\ln(SSR_t) -$ (-0.326) $0.639*\ln P_M$ (-1.171)	$R^2 = 0.18$

Other Latin America

Area:	$\ln A_t =$	$5.779 +$ (3.201)	$0.542*\ln A_{t-1} +$ (3.782)	$0.197*\ln P_x -$ (2.147) $0.109*\ln T$ (-2.957)	$R^2 = 0.85$
Yield:	$\ln Y =$	$0.026 +$ (0.782)	$0.084*\ln T$ (6.364)		$R^2 = 0.60$
Demand	$\ln(D/N) =$	$-6.782 +$ (-21.414)	$0.824*\ln(E/N) -$ (1.279)	$0.294*\ln T$ (-6.034)	$R^2 = 0.72$
Exports:	$\ln X_t =$	$3.135 +$ (4.869)	$0.281*\ln X_{t-1} +$ (1.960)	$0.141*\ln SSR +$ (0.370) $0.496*\ln P_w/P_x$ (4.566)	$R^2 = 0.58$
Imports:	$\ln M_t =$	$2.666 +$ (3.865)	$0.433*\ln M_{t-1} +$ (3.077)	$0.479*\ln(SSR) -$ (0.542) $0.744*\ln P_M$ (-2.824)	$R^2 = 0.58$

Turkey

Area:	$\ln A_t =$	$13.783 -$ (9.165) $0.159*\ln A_{t-1} +$ (-1.222)	$0.528*\ln P_t +$ (3.329)	$0.174*Dummy2 -$ (3.448)	$0.108*Dummy3$ (-1.846)	$R^2 = 0.97$
Yield:	$\ln Y =$	$-0.716 +$ (-8.445)	$0.227*\ln T$ (6.969)			$R^2 = 0.64$
Demand	$\ln(D/N) =$	$-6.043 +$ (-63.852)	$0.286*\ln(E/N) -$ (1.339)	$0.151*Dummy1$ (-1.734)		$R^2 = 0.13$
Exports:	$\ln X_t =$	$2.913 +$ (3.173)	$0.365*\ln X_{t-1} -$ (1.833)	$0.019*\ln(SSR) +$ (-0.086)	$0.143*\ln P_w/P_x$ (0.454)	$R^2 = 0.12$
Imports:	$\ln M_t =$	$7.863 +$ (2.721)	$0.480*\ln M_{t-1} +$ (3.919)	$0.670*\ln(SSR) -$ (1.062)	$3.510*\ln P_M$ (-2.240)	$R^2 = 0.85$

Other Near East

Area: $\ln A_t =$ 2.589 + 0.756*$\ln A_{t-1}$ + 0.042*$\ln P_x$ $R^2 = 0.69$
       (1.465) (4.471)   (0.584)

Yield: $\ln Y =$ -0.245 + 0.135*$\ln T$ $R^2 = 0.45$
        (-3.323) (4.752)

Demand $\ln(D/N) =$ -8.793 + 0.691*$\ln(E/N)$
        (-36.879) (2.340) $R^2 = 0.16$

Exports: $\ln X_t =$ 1.768 + 0.275*$\ln X_{t-1}$ + 0.832*$\ln(SSR)$ + 0.544*$\ln P_w/P_x$ $R^2 = 0.36$
          (3.517) (1.547)   (1.894)   (1.809)

Imports: $\ln M_t =$ 0.783 + 0.761*$\ln M_{t-1}$ − 0.291*$\ln(SSR)$ + 0.016*$\ln P_M$ $R^2 = 0.92$
          (2.455) (10.217)   (-2.386)   (0.190)

China

Area: $\ln A_t =$ 3.602 + 0.759*$\ln A_{t-1}$ − 0.311*$\ln P_x$ $R^2 = 0.85$
       (2.246) (7.076)   (-1.480)

Yield: $\ln Y =$ 0.893 − 0.115*$\ln T$ − 0.070*Dummy1 − 0.214*Dummy2 $R^2 = 0.66$
        (9.225) (-3.470)   (-0.881)   (-4.771)

Demand $\ln(D/N) =$ -5.553 + 0.549*$\ln(E/N)$ $R^2 = 0.75$
        (-53.692) (9.089)

Exports: $\ln X_t =$ 0.294 + 0.908*$\ln X_{t-1}$ + 0.720*$\ln(SSR)$ + 0.108*$\ln P_w/P_x$ $R^2 = 0.76$
          (0.655) (8.809)   (1.555)   (0.346)

Imports: $\ln M_t =$ 0.523 + 0.818*$\ln M_{t-1}$ + 1.322*$\ln(SSR)$ − 0.020*$\ln P_M$ $R^2 = 0.61$
          (1.120) (5.291)   (1.780)   (-0.181)

India

Area: $\ln A_t =$ 12.601 + 0*$\ln A_{t-1}$ + 0.016*$\ln P_x$ + 0.028*Dummy1 − 0.017*$\ln T$ $R^2 = 0.22$
       (50.235) (1.788)   (0.242)   (0.482)   (-0.473)

Yield: $\ln Y =$ -0.381 + 0.205*$\ln T$ $R^2 = 0.86$
        (-9.491) (13.237)

Demand $\ln(D/N) =$ -7.400 + 0.139*$\ln(E/N)$ $R^2 = 0.18$
        (-116.50) (2.422)

Exports: $\ln X_t =$ 3.745 + 0.026*$\ln X_{t-1}$ + 1.247*$\ln(SSR)$ + 0.359*$\ln P_w/P_x$ $R^2 = 0.31$
          (5.450) (0.161)   (2.887)   (1.911)

Imports: $\ln M_t =$ -1.924 − 0.057*$\ln M_{t-1}$ − 0.042*$\ln(SSR)$ − 0.154*$\ln P_M$ $R^2 = 0.16$
          (-0.723) (-0.055)   (-0.009)   (-0.286)

Other Far East

Area:	$\ln A_t =$	6.325 + (2.961)	$0.510*\ln A_{t-1} +$ (3.116)	$0.205*\ln P_x$ (2.105)	$R^2 = 0.55$
Yield:	$\ln Y =$	-0.254 + (-4.408)	$0.106*\ln T$ (4.795)		$R^2 = 0.45$
Demand	$\ln(D/N) =$	-6.771 + (-56.629)	$0.011*\ln(E/N) -$ (0.139)	$0.085*\ln T$ (-2.269)	$R^2 = 0.53$
Exports:	$\ln X_t =$	4.711 – (5.238)	$0.002*\ln X_{t-1} +$ (-0.012)	$1.220*\ln SSR +$ (3.383)	$0.143*\ln P_w/P_x$ (0.686)	$R^2 = 0.56$
Imports:	$\ln M_t =$	1.567 + (1.802)	$0.721*\ln M_t -$ (5.799)	$0.699*\ln(SSR) -$ (-1.777)	$0.160*\ln P_M$ (-0.560)	$R^2 = 0.76$

7   Additional estimation results

An effort was made to estimate the required parameters for some other large countries that have an important position either in world tobacco production or consumption, such as Indonesia, Egypt, Algeria etc. The results however have not been promising and the model was maintained in its form with the parameters shown in section 6 above.

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