



# FSO News

07 Agriculture and forestry

Neuchâtel, June 2016

A look at the primary economy in Switzerland

## Economic valuation of standing timber stock in Switzerland

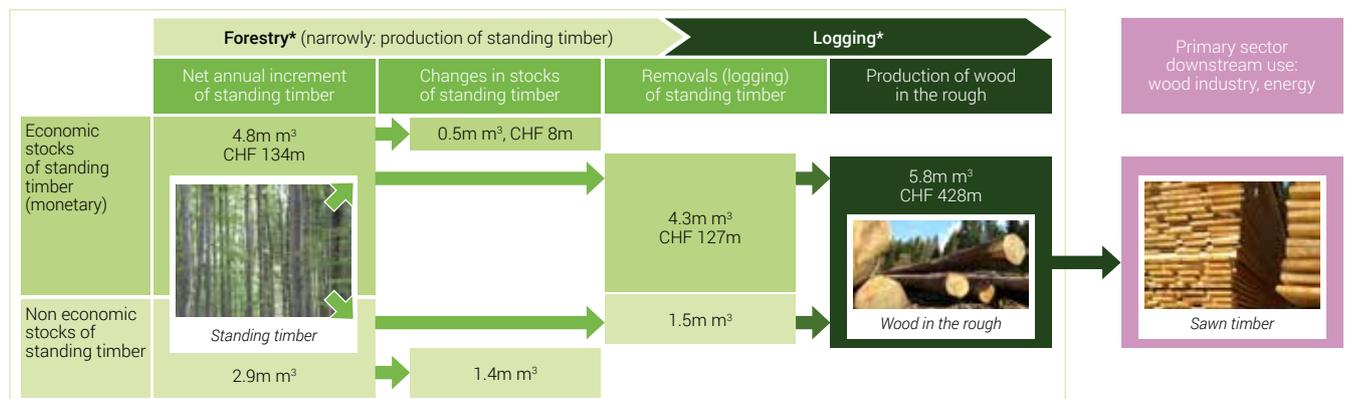
Forests cover 30% of Switzerland's territory, with a volume of standing timber of almost 430 million m<sup>3</sup>. Over 60% of this stock of living trees could be used while covering the operating costs, representing a potential value of CHF 8.8bn in 2014. This economic potential is greatly influenced by the timber market and the valuation is made independently of Swiss legislation governing forest operations. For the first time in Switzerland, the Federal Statistical Office has carried out an economic valuation of the standing timber stock and its fluctuations, incorporating the results of the National Forestry Inventory into the Economic Accounts for Forestry.

### Forestry in the economic cycle

The place of forestry in Switzerland's economic cycle is described in the Economic Accounts for Forestry (EAF). Standing timber in Swiss forests is the product of forestry (in the narrow sense of the word), provided that the growth and care of these trees is managed by units such as public business or private owners. The value of standing timber is calculated by deducting operational costs from the potential income from wood in the rough. If this value is positive, then the stock is economic and monetised; if the value is negative the stock is non-economic and is given no value. To produce wood in the rough, the logging industry draws from these two categories of stock (F1).

### Timber flows and stocks (2013)

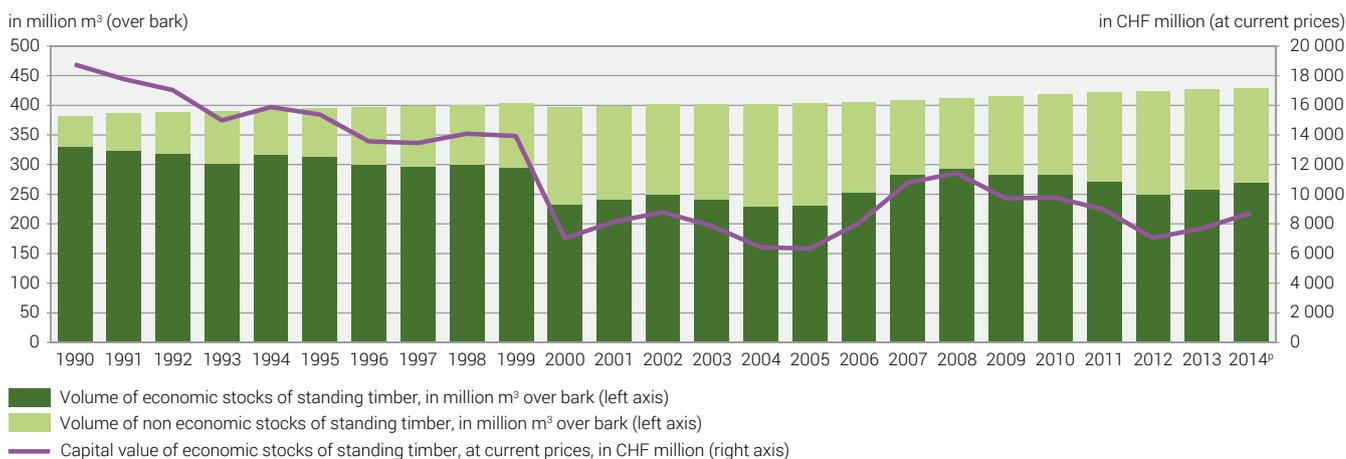
F 1



\* Industries (economic activities) covered by the Economic Accounts for Forestry (EAF). Timber volumes in "standing timber over bark equivalents"  
Figures are rounded up or down, which means that when the figures are added together they may differ from the total.

## Volume and value of standing timber in Swiss forests

G 1



Source: Economic accounts for forestry (EAF)

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### Theoretical and practical categorisation of stocks

According to international standards, the production of standing timber is an economic activity which takes place within the production boundary and is by definition managed by institutional units, in particular public and private forestry enterprises. However, the natural growth of wood without human intervention, as for example in the Swiss National Park, belongs to the growth of non-cultivated biological resources and takes place beyond the production boundary and is therefore not considered in monetary terms.

The vast majority of forests in Switzerland are subject to forest management. However, a significant proportion of these forests are particularly expensive to operate, especially in the mountainous regions of the Pre-Alps and Alps, where access is difficult. Potential income from the sale of wood in the rough is often insufficient to cover operational costs. Therefore, an economic delimitation within the production boundary is necessary, as only stocks of standing timber whose potential value is positive are included in the monetary valuation. Between 1990 and 2014

the percentage of economic stocks in Switzerland overall fell from 87% to 63% (G2), highlighting the deterioration of conditions enabling the economic viability of forestry operations.

### Breakdown of the total change in stocks

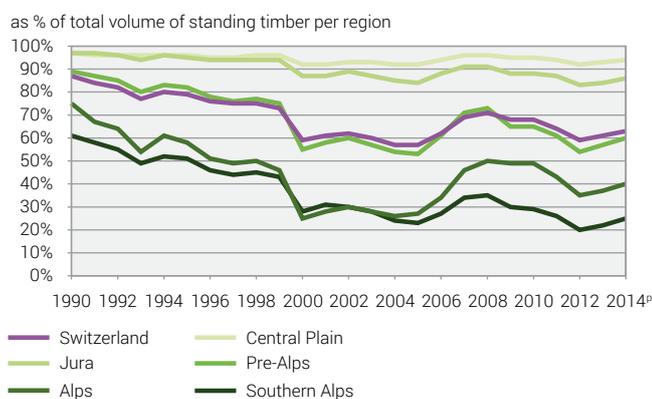
Numerous factors influence the total change in stocks of standing timber. Breaking it down enables the different variations in the volume and value of stocks to be detected and interpreted.

#### The price of standing timber (stumpage price)

In Switzerland, commercial sales of standing timber are rare. The majority of standing timber used as input for wood in the rough is, therefore, produced and consumed by the forestry holdings themselves (F1). There is no significant market where the prices of standing timber can be observed. This means that the stumpage price is estimated indirectly by the difference between the potential price of wood in the rough and the operational costs by m<sup>3</sup> related to the logging, cutting and transporting of timber (G3).

### Regional shares of economic stocks of standing timber

G 2

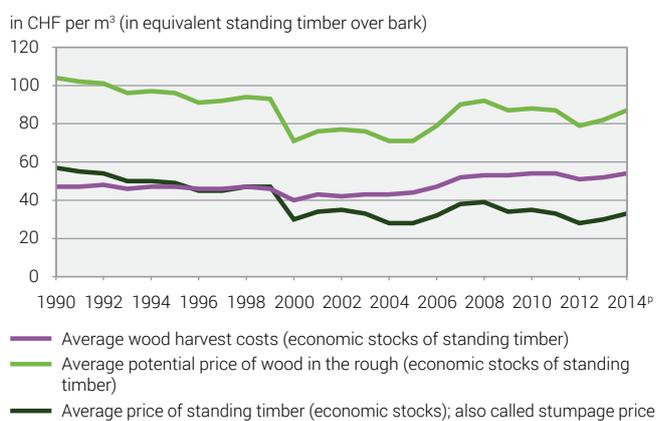


Source: Economic accounts for forestry (EAF)

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### Timber prices and harvest costs

G 3



Source: Economic accounts for forestry (EAF)

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The annual growth of trees is relatively stable and is influenced by natural conditions, in particular the orientation, the soil, the length of the period of vegetation and rainfall. In contrast, the harvesting of timber fluctuates quite considerably, usually between 5 and 7 million m<sup>3</sup> per year (in standing timber over bark equivalents).

The effects of the Lothar hurricane (December 1999) serve as an example of such fluctuations. The total stock of standing timber fell by 7 million m<sup>3</sup> between 1999 and 2000, i.e. less than 2% of the total volume of Swiss forests. This decline is the result of the difference between a net increment of 7 million m<sup>3</sup> and the forced removal of 14 million m<sup>3</sup> of standing timber. This excess caused the price of timber to fall considerably (G3), and led, in terms of volume, to 55 million m<sup>3</sup> of timber being downgraded to non-economic stock, as it was no longer viable. (G1).

In monetary terms, the effects of Lothar were even more pronounced. First, the removals of the economic stock of standing timber were almost CHF 200m greater than its net increment in 2000 (G4). Second, the value of the capital stock of standing timber fell by CHF 2.6bn, due to the downgrading of stocks that had become non-economic. Thirdly, the 36% drop in the price of standing timber between 1999 and 2000 brought about holding losses of CHF 4.1bn on those stocks that had remained economically viable. In total, the value of standing timber was halved in the 2000 accounts (G1), i.e. a decline of CHF 6.9bn.

### Change in the economic capital stocks of standing timber

The economic value of standing timber has fluctuated greatly since 1990 (G1) and reflects the recent history of Switzerland's forestry economy.

The economic capital value of standing timber was almost CHF 19bn in 1990 and fell gradually in the subsequent decade due to the falling price of timber caused by a downturn in the construction industry.

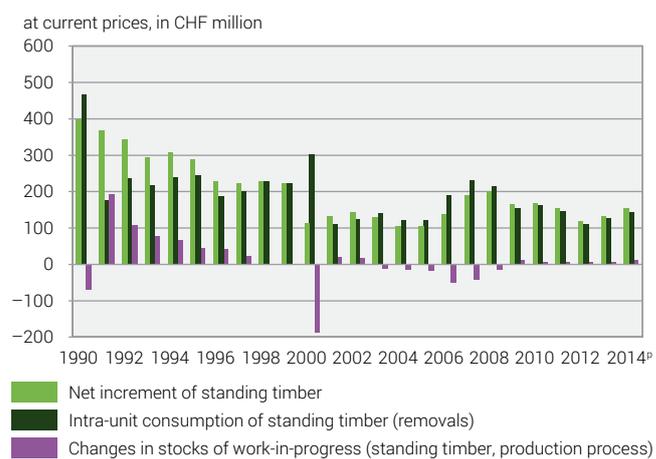
This was followed by a drop in 2000 due to the Lothar hurricane. The saturation of the market caused by windthrow (storm wood) took several years to be reabsorbed. Sales conditions improved between 2005 and 2008, leading to the over-harvesting of economic stocks (G4).

The global economic crisis then reversed the situation, leading to a decline in prices from 2009. The weakening of demand for timber in neighbouring countries generated excess supply in timber, putting pressure on the Swiss domestic market. This low price level was exacerbated by the gradual decline of the euro against the Swiss franc, making imported wood ever more competitive. The volume of Swiss wood harvested thus declined, leading to a situation of slight underharvesting of timber resources, which explains why the use of economic stocks was slower than their growth (F1, G4).

Since 2012, growing demand for wood fuel has brought about a slight increase in the price level and therefore in the volume and value of economic standing timber stocks, valued at CHF 8.8bn in 2014 (G1).

### Production of economic standing timber

G 4



Source: Economic accounts for forestry (EAF)

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### Balance sheet of the standing timber in Switzerland (2013)

T 1

	Physical values, in thousand m <sup>3</sup> (in equivalent standing timber over bark)			Monetary values, in CHF million (at current prices)
	Total stock of standing timber	Work-in-progress (economic stocks of standing timber)	Non economic stocks of standing timber	Work-in-progress (economic stocks of standing timber)
<b>Stocks (01), opening (01.01.2013)</b>	<b>424 266</b>	<b>249 940</b>	<b>174 326</b>	<b>7 085</b>
+ Gross annual increment	+10 257	+6 385	+3 873	irrelevant
- Mortality	-2 565	-1 546	-1 018	
= Net annual increment	+7 692	+4 838	+2 854	+134
- Removals	-5 814	-4 315	-1 498	-127
= Changes in stocks due to the production process	+1 879	+523	+1 356	+8
+/- Reclassification and declassification, other changes in volume	0	+8 105	-8 105	+229
+/- Revaluation (holding gains and losses)	irrelevant			+403
= Total changes of stocks	+1 879	+8 628	-6 749	+640
<b>Stocks (01), closing (31.12.2013)</b>	<b>426 144</b>	<b>258 568</b>	<b>167 576</b>	<b>7 726</b>

Source: Economic accounts for forestry (EAF)

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Economic stocks have been harvested to the limit of their rate of renewal. Currently, approximately 70% of the increase in the total stock of standing timber is composed of non-economic stocks (T1).

## Methodology

### Revision of the Economic Accounts for Forestry

As part of the National Accounts (NA) revision in 2014, with the introduction of the European System of Accounts 2010 (ESA 2010), the FSO decided to introduce the economic valuation of standing timber into the Economic Accounts for Forestry (EAF), which are satellite accounts to the NA. Quality and time series of data available as well as changes to methodology and standards motivated us to take this decision. In the near future these will continue to be pilot statistics; they will become part of the NA central framework once the consolidation phase has been completed. This will take place during one of the next complete revisions of the NA.

The introduction of the complete economic valuation of the process of production of standing timber has an impact on the value added of the forestry industry. This effect corresponds to the differences of new accounting positions, i.e. the net increment of standing timber (recorded as output) less self-consumption of standing timber from this economic stock (recorded as intermediary consumption), and is equal to the changes in stocks (G4).

### Method for the economic valuation of standing timber

#### Main sources

The economic valuation of standing timber in Swiss forests is based on four main sources, which are if necessary annualised and harmonised by the FSO:

- Data of the sample plots (stocks and changes) from the National Forestry Inventory which is compiled by the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL) in cooperation with the Federal Office for the Environment (FOEN).
- The techniques and costs of forestry harvesting with information from sample NFI plots.
- The statistics on prices of wood in the rough, compiled until 2014 by the FSO, and since 2015 by the Swiss forest owners association.
- The FSO's Economic Accounts for Forestry (EAF) – before final closing – as the source for harvesting of wood in the rough in physical and monetary terms.

#### Calculation

The value of standing timber is calculated by NFI plot and by year by deducting the harvesting costs from the potential income from wood in the rough, which are obtained by multiplying the volume of different varieties of wood by their respective prices. If the value of standing timber is positive (i.e. with a positive profit margin over changing costs), the stock is considered to be economic. Each plot is classified according to the type of stock (economic, therefore monetised; non-economic, therefore not

monetised) and belongs to one of 10 layers (5 forestry regions, a distinction being made between private and public sectors). A factor of annual multiplication is calculated for each of the 10 layers, enabling the sample to be extrapolated. This factor is defined as the ratio between the NFI reference volume of standing timber for a given layer and the cumulated volume of all lots from this same layer. The extrapolated and aggregated values are included in the final closing of the EAF.

### Additional information available on the internet

#### Economic and satellite accounts of the primary sector (in French and German):

[www.statistics.admin.ch](http://www.statistics.admin.ch) → Topics → 07 – Agriculture, forestry Tables, interactive database, methodology etc.

#### National Forestry Inventory

[www.lfi.ch](http://www.lfi.ch)

Results available from NFI 1 to 4, terminological definitions etc.

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