

Hurricane “Lothar” and the forests of Baden-Württemberg (Germany)

– damages, impacts and effects

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Introduction:

Baden-Württemberg, the third largest of sixteen states of the federal republic of Germany, is located in the south-west of the country. It borders on France in the west (Rhine valley), on Switzerland in the south, and is famous for the Black Forest (Schwarzwald).

Baden-Württemberg is densely populated (293 inhabitants/km²) but 39% of the surface is wooded. Forest owners in Baden-Württemberg are the federal state (24%), private forest owners (37%, ~260,000 forest owners with an average property of 1.3 hectares) and communities (towns, municipalities, 39%, 1100 communities with an average property of 500 hectares) (figure 1 and 2). Parts of these properties are bordering on each other and are fragmented and meshed together.

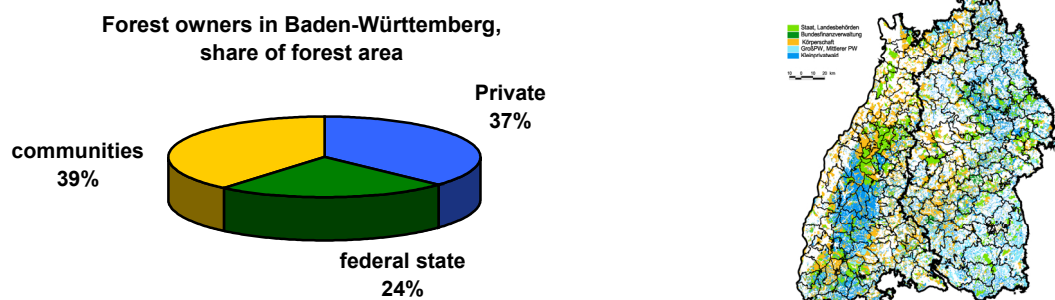


Fig. 1: Share of forest owners in Baden-Württemberg.

Fig. 2: Allocation of the forests in Baden-Württemberg, green = state forest, yellow = community forest, light blue = private forest > 200 ha property, light blue = private forest < 200 ha property.

As a result of these facts, the forest administration in Baden-Württemberg is organised as an unity forest service for all forest owners. It consists of 849 forestry districts (each led by a forestry officer) with an average expanse of 1,025 hectares and properties of all forest owners. About 7 forestry districts are headed by 1 forestry office (all in all 163) with an average expanse of 7,500 hectares of forest land. The headquarter of the forest administration is located at the ministry of food and rural development in the state capital Stuttgart.

The national forest service manages the state forest, is responsible for assistance and (technical) support of other forest owners and for the distribution of financial allowances. Optional, the state forest administration take on the management of forests of other owners based on a management contract (esp. in community forests). In addition, forest offices are supervisory authorities and are responsible for ensuring that forest owners keep to the forest law.

The growing conditions in South-Western Germany are excellent. The average solid volume over bark in Baden-Württemberg is about 350 m³ per ha. The average solid volume over bark in Germany is 270 m³ per ha.

The annual increment average in Baden-Württemberg (solid volume over bark) is for deciduous trees 8 m³ per ha, for Norway spruce about 13 m³ and for Douglas fir about 15 m³ per ha.

The average annual cut is 7.3 m³/ha, 10.4 m³ in the state forest, 8.9 m³/ha in the community forests and about 4.0 m³/ha in the private forests.

Concerning the tree species, coniferous trees are dominating in the forests of Baden-Württemberg:

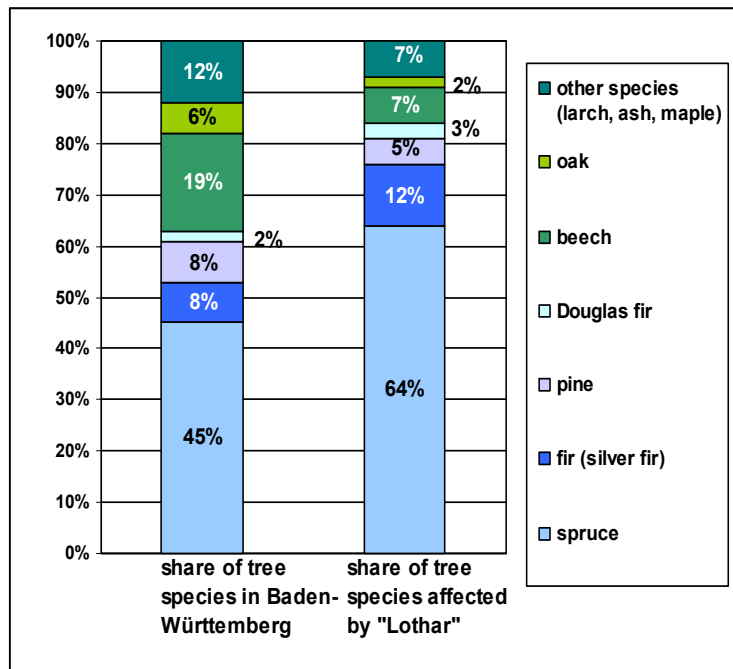


Fig 3: share of tree species in Baden-Württemberg and share of tree species affected by "Lothar"

The aim for further silvicultural planning is a 50:50 share of coniferous and deciduous trees adapted to the soil conditions.

Hurricane "Lothar":

Hurricane "Lothar" caught the people of Baden-Württemberg around noon on 26, Dec. 1999. The strongest squalls (up to 210 km/h) lifted roofs off, cut power lines and broke or uprooted trees. Roads and railway tracks were impassable. But "Lothar" not only hit the south-west of Germany; France and Switzerland were affected as well. The hurricane felled 185 Mio. m³ wood altogether in western Europe.

Table 1: Storm damage in the forests of Europe

	mio m ³	in normal annual yields (%)
Baden-Württemberg	30	350
- Community forests	14,1	
- State forest	10,7	
- Private forests	5,1	
Switzerland	12	250
France	138	400
Europa (sum)	185	

The consequences for the forests of Baden-Württemberg: ~ 40.000 hectares windthrow and about 30 Mio. m³ felled wood, which is more than 300% of the normal annual yield.

The centres of the damage in Baden-Württemberg were located at the western slopes of the Black Forest along the Rhine valley. The hurricane, making its way from central France, hit these areas with force. A second centre was located in the North-eastern parts of Baden-Württemberg. Even so called "stormproof" deciduous trees adapted to the soil were uprooted or broken. Nevertheless, more than 80% of the damages concerned coniferous trees,

especially spruce stands (64% of the damaged trees) (see figure 3). The livelihood of some forest farmers in the middle black forest was threatened by the damages. “Lothar” was the second severe hurricane in ten years after “Vivian and Wiebke” in February/ March 1990.

Strategies:

Following the first reports about the damages, the headquarter issued important strategies for further actions and the processing of the wood.

First of all, it was important to keep calm and to draw up strategies adapted to local conditions. Roads had to be cleared and wood moved away.

The processing of the affected stands was handled according to the following strategies:

- 1) To process and sell valuable deciduous trees before conifer trees
- 2) To conserve good quality conifer logs in wet lumberyards
- 3) To process little windthrow areas before larger windthrow areas (to prevent the spread out of insect damages)
- 4) To process first stands of private forest owners before community or state forest stands to enable them to sell their wood first to good conditions and to enable a quick return on investment.

Hand in hand with these first strategies, the government of Baden-Württemberg, the government of Germany and the EU decided to support the affected forest owners by financial assistance:

50 Mio. € direct support by the state of Baden-Württemberg, 12,5 Mio € by Germany and the EU, e.g.

- Loans with reduced rate of interest for the processing as an interim finance for affected private forest owners.
- Financial allowances for conservation of the processed timber and reforestation.

Investment aid and financial support for wet lumberyards, rebuilding aid and financial assistance to secure the livelihood of extremely affected private forest owners.

Institutional help by the national forest service:

- services free of charges for private forest farmers (sale of the wood felled by the storm)
- Additional forest officers in the districts to support private forest owners in particular
- Restraint of fast processing in the state forests to enable private forest owners to sell their timber first.

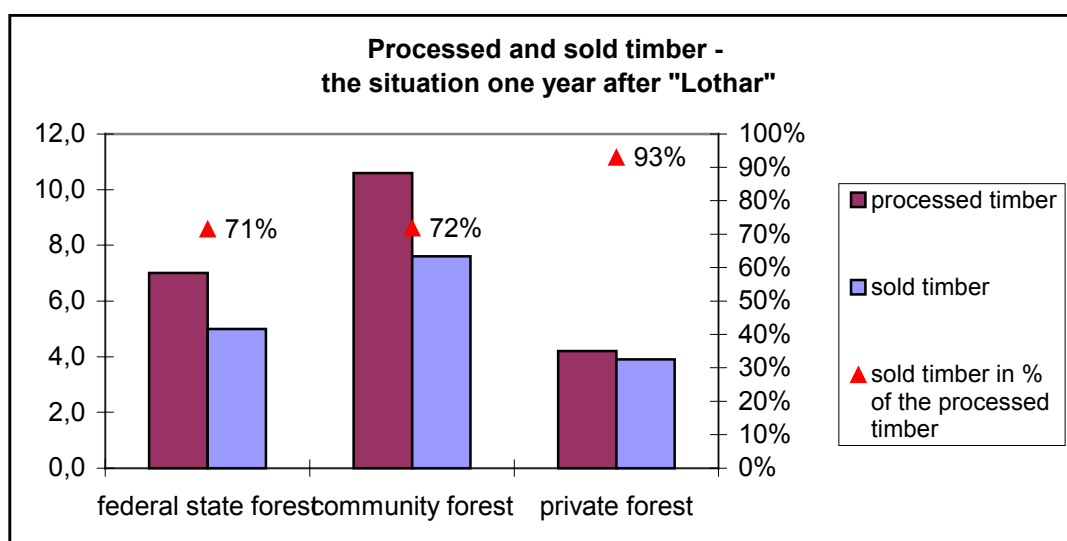


Fig. 4: Processed and sold timber of different forest owners one year after “Lothar”.

Processing:

Preconditions:

- The processing of 30 Mio m³ felled timber was only possible with the help of private logging enterprises and forest officers and forest workers of other federal states.
- Careful logging/processing to protect the soil, driving only on special skidding roads.
- technical support by harvester-technology for the protection of the forest workers.

Depending on the slope of the site and soil conditions of the stands about 14 processing methods were recommended by the forest administration. Stands with bigger logs were for instance cleared by chain saw and skidder, younger stands on plains were mostly processed by harvester. At the steepest slopes in the black forests, cable cranes were used. The costs to process 1 m³ log were about 22 € - 26 €, depending on the diameter of the logs, the inclination of the slopes and the used mechanical techniques (Cable crane about 42 €/ m³).

Because of the surplus of logs, the prices on the local markets decreased, partly by about 30-40%, especially for coniferous logs (Spruce). To stop the drop-off in prices and to preserve the quality of the logs, about 4,4 Mio. m³ spruce was stored in wet lumberyards. These logs were sold about 1.5 years after the storm to better prices.

Table 2: Drop-off in prices after Lothar

Prices in €	autumn 1999	spring 2000	summer 2000	Wet lumberyard, summer 2001
Norway spruce/ silver fir, “normal” quality, diameter 30-34 cm	85	57	47	57

Despite this, the market for valuable deciduous logs (beech, oak, acer) was still good.

Regeneration:

Experience in the ten years between the last big hurricane „Wiebke/Vivian“(1990) and „Lothar“ showed that the natural regeneration potential on windthrow areas is much higher than expected. These experiences are now used to reduce the reforestation expense. The aim of the “nature-based forestry” is to use more natural regeneration. Adapted to the soil (habitat) conditions, mixed, uneven-aged, productive and “stormproof” stands are planned on the windthrow areas.

On 51% of the windthrow areas, deciduous trees in mixed stands are planned, on 46% of the area, coniferous forest is planned. The remaining 3% are new protective forest, where windthrow areas will not be regenerated by man.

The planning of the regeneration has not been completed yet, but on nearly one third of the area, the natural is already existing. On one other third, natural regeneration is expected and on the last third of the windthrow area, reforestation is planned and trees are already planted.

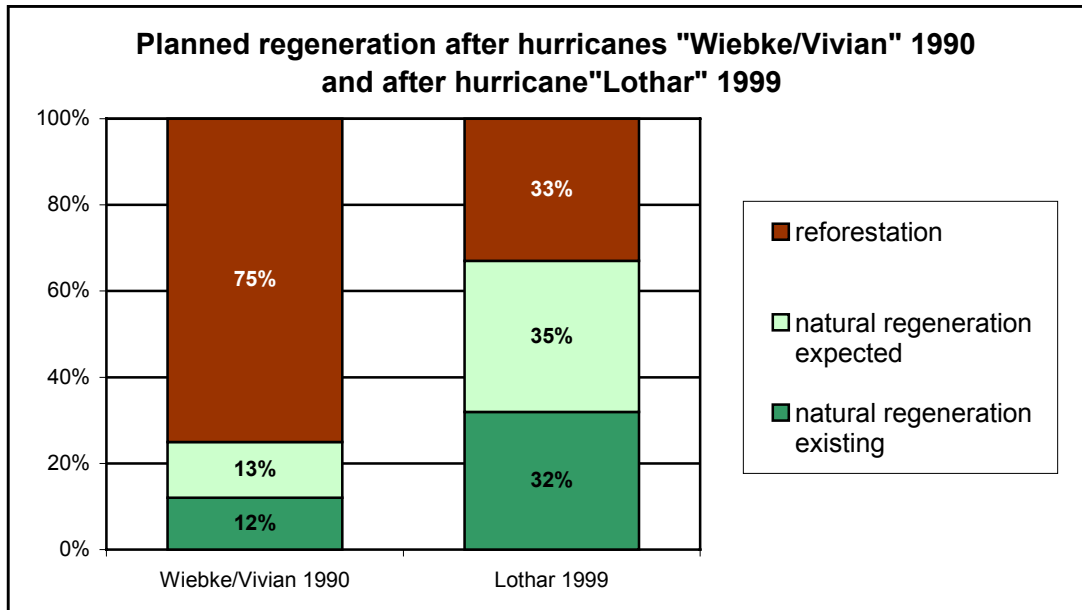


Fig.: 5: Planned regeneration after hurricanes in Baden-Württemberg

Costs

The cost for the elimination of storm damages in Baden-Württemberg were about 1.224 mio. €.

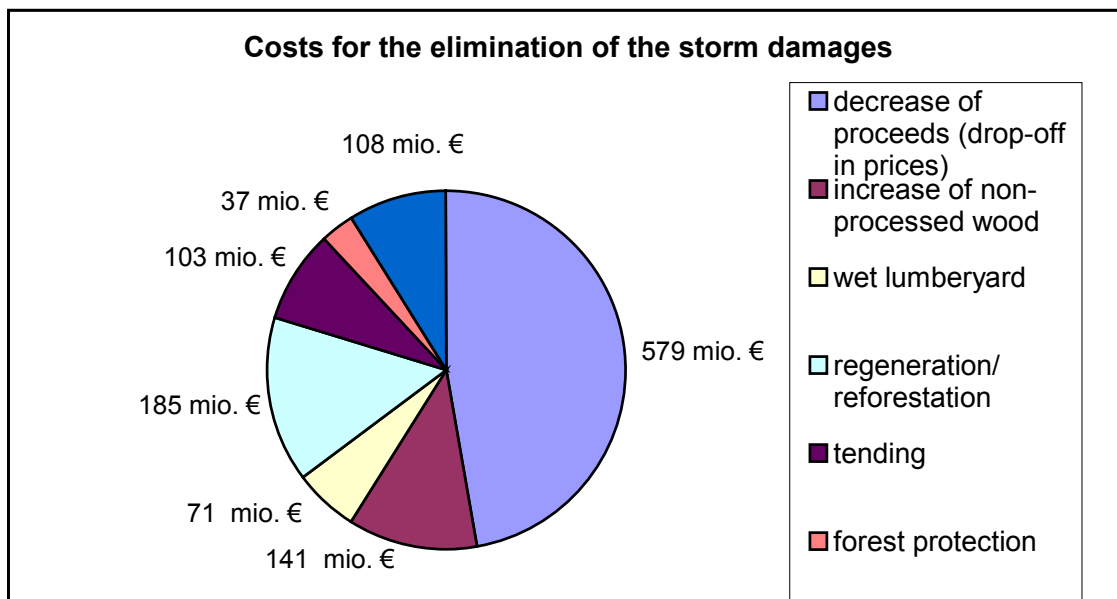


Fig.: 6: Costs of the elimination of the storm damages caused by "Lothar".

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