

# Technical and economical potential and harvest possibilities for poplar and willow short rotation coppice (SRC) in south-west Germany

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## Method

To assess the theoretical and technical SRC-potential, different restrictive factors for the SRC cultivation on crop- and grassland were indicated and included in the computation:

- > water supply, described by the pedological humidity stages (fig.1)
- > mean temperature during the growing season (fig.2)
- > limitations because of land competition for food production on cropland (fig.3)
- > restrictions thru nature-, landscape- and water protection areas on grassland (fig.4)
- > technical constrains by step inclinations and small plot sizes (fig.5)

Depending on the site-conditions, the yields per hectare will be estimated and in comparison with the cultivation costs the economic potential will be assessed in the next step.

Fig. 1: SRC-site classes dependent on the pedological humidity stages and the mean temperature in the growing season on crop- and grassland

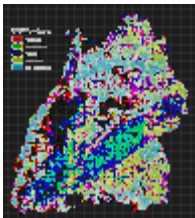


Fig. 2: percentage of the community area which has medium to very favourable site conditions for the cultivation for SRC on crop- and grassland

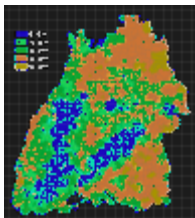


Fig. 3: percentage of the community area which is preferential usable for SRC on cropland, in matter of site conditions and land competition for food production

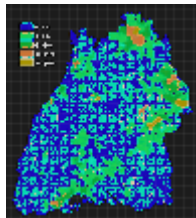


Fig. 4: percentage of the community area which is preferential usable for SRC on grassland, in matter of site conditions and restrictions thru protective areas

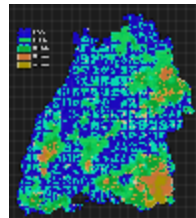
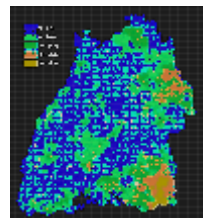


Fig. 5: percentage of the community area which is preferential usable for SRC on crop- and grassland, in matter of the previous and technical restrictions (slope > 15 %)



## Background

Baden-Württemberg is a federal state located in the south west of Germany. The total area of BW comprises 3.6 mio ha, out of which approximately 1.4 mio ha (38.1% of the total area) are forested, mainly in even-aged mixed stands and also 1.4 mio ha are in agricultural use. Areas for short rotation coppice are mostly in small scale dimensions. Terrain is often hilly with low mean air temperatures. At the moment, not more than 200ha are planted with SRC



When potential areas for SRC are identified, the next step is to define that harvesting- and logistic concept which is the best option for given conditions.

Harvesting and logistics are causing the highest costs in the value chain; especially harvesting operations in small scale plantations cause higher costs than larger ones (up to 150%).

Availability of machines and requirements to the material help to decide a system.

After identification, the harvest- and logistic systems are modeled and connected to costs to do a cost-benefit-analysis.

Option 1: forage harvester



Option 2: forage harvester with (intermediate) storage



Option 3: stick harvester and chipper



## Results

[per m <sup>3</sup> loose]; in €	Option 1	Option 2	Option 3
Moisture content	50	30	20
Harvest (excluding machine transport)	6 -12	6 -12	10 -15
Transport (5km)	2.80 – 5.09	2.8 – 5.09	1.28-2.30
Storage (under roof)	0	1.11	0
Chipping (if separate)	0	0	5
costs	8.8 – 17.09	9.99 – 18.02	16.28 -23.3
revenue -expectation	11	17.5	20
gross value added	-6.09 – -2.22	-0.7 – 7.5	-3.3 – 3.7

## Conclusion

- > In terms of costs, SRC can be an interesting opportunity, depending on the conditions
- > harvesting- and logistics cause the main costs & have to be considered already before planting
- > harvesting machine, transport distance, requirements regarding moisture content/ quality have to be included into the planning
- > with an optimized process chain traditional agriculture can be expanded and supported in an economical way
- > In terms of ecological aspects, SRC is supposed to have a very great performance (next step in future)

Many external factors influence the performance of a SRC:

- > is there's a market for the products?
- > can the products be used in an own heating plant?
- > which moisture content and other requirements are demanded?
- > are there harvesting machines in the region available?
- > .... and more

More information:

Internet: <http://probiopa.imk-ifu.kit.edu/>

Aust et al. (2010): "Short rotation plantation in south-west-Germany". In: conference proceedings of FORMEC 2010, Padova.

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