

Production of willow (salix)

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Ny Vraa Bioenergy I/S.

- 230 ha. of willow.
- Advisory-service.
- Sales and production of cuttings.
- Plant, harvest and sell woodchips.
- Development of machinery.



Where to plant?

- All fields can be planted, but high water-retaining capacity or irrigated fields are preferable.
- You can plant wetlands – but remember - one day they must also be harvested!
- Good soil condition.
- Willow need light and heat.



Harvest with JF Z20.



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Harvest with Class – on tracks!



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Claas header.



Unloading chips.



JF Z200-Hydro/E.



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Logistics and havest.

- Storage in the fields....
- Access roads in "all" type of weather .



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Preparation of the land .

- Prepare a seedbed like it was for wheat!
- Ploughing eg. in combination with Roundup.
- Harrow.
- Remove stones.
- Roll the land.

Planting – Egedal Energy Planter





Planting.



Pest & diseases.

- "Willow Beetle".
- Topspindelarve.
- Stankelbenslarver
- Rust!

Pest & diseases.



Pest & diseases.



????



Fertilizer and weed control

- Planting year 0 kg. N
- Weed control – mechanical.
- Renholdelse – chemistry.



Weed control.



Weed control.



Weed control!!!!



Effect of deep ploughing!



Weed control – ;-)



Weed control in organic willow.



Weed control – cultivator.



Weed control – cultivator.



Growth, 1 year 2007/08



Growth, 2008/09. Old root vs. new root.



Re-establishment.



Roots and drainage.



The bennefit of the environment.

- Reduced or (almost) no leaching from the root zone (EU WFD)
- Protection of the drinking water
- Less consumption of pesticides and fertilizer (manure).



Reduction of pesticides.

- Treatment index: 0,5 – political goal: 1,7
- A good argument in order to protect the aquatic.
- After 3-4 years, willow can be grown without pesticides



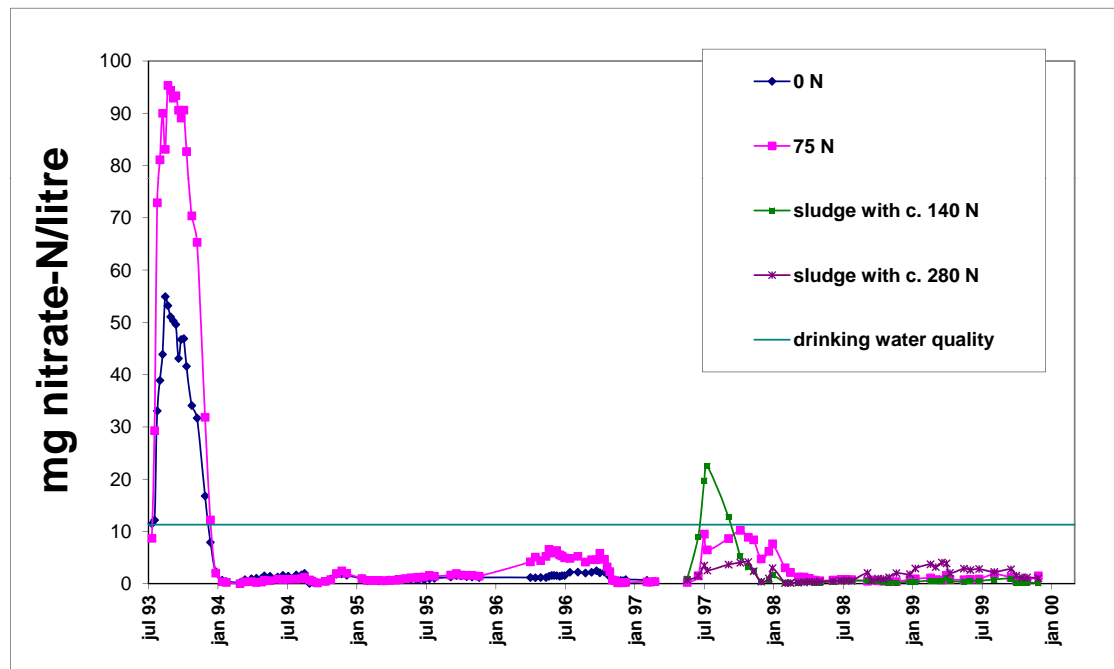
Less nitrate leaching.

- Willow can be used in "buffer zones"
- 70% less leaching than from annual crops.*
- Willow creates "balance".

* Uffe Jørgensen, Dept. of Agroecology and Environment, University of Aarhus.



Nitrate leaching on loamy sand.

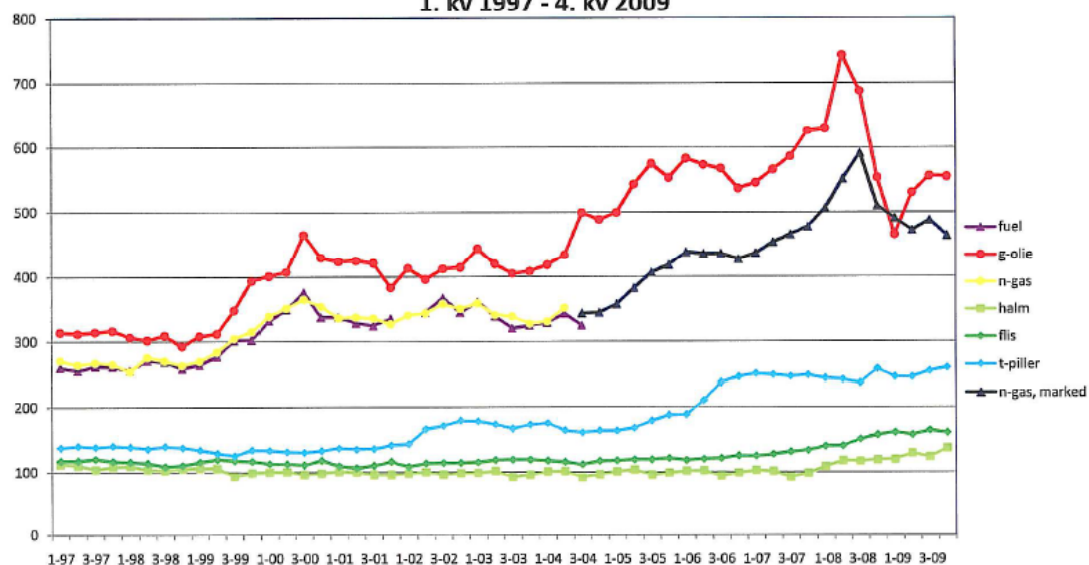


Economy

Crop	* V. Wheat	* Barley	* Willow
Yield	7776,00	5967,00	12,00
Price – Willow = 42 DKK. /GJ	1,88	1,99	770,00
Gross yield	14618,88	11874,33	9240,00
Deduction	45,00	565,00	
Co-products	197,00	337,00	
Total	14770,88	11646,33	9240,00
Seed, fertilizer, chemicals etc.	2184,00	1729,00	1313,00
Contribution margin	12586,88	9917,33	7927,00
Wages, machinery, drying etc.	3278,00	3015,00	2299,00
Net contribution margin	9308,88	6902,33	5628,00
Crop price 1,5 DKK. (40 DKK./ GJ)	6354,00	3978,00	5196,00
Crop price 1,2 DKK. (38 DKK./GJ)	4021,00	2188,00	4764,00
Crop price 1 DKK. (36 DKK. /GJ)	2466,00	995,00	4332,00
Crop price 0,8 DKK. (34 DKK. /GJ)	911,00	-199,00	3900,00

Economy

Brændselspriser kr/MWh
1. kv 1997 - 4. kv 2009



Game



Deer and willow!



Partridge & pheasant:



More information.

www.nyvraa.dk

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