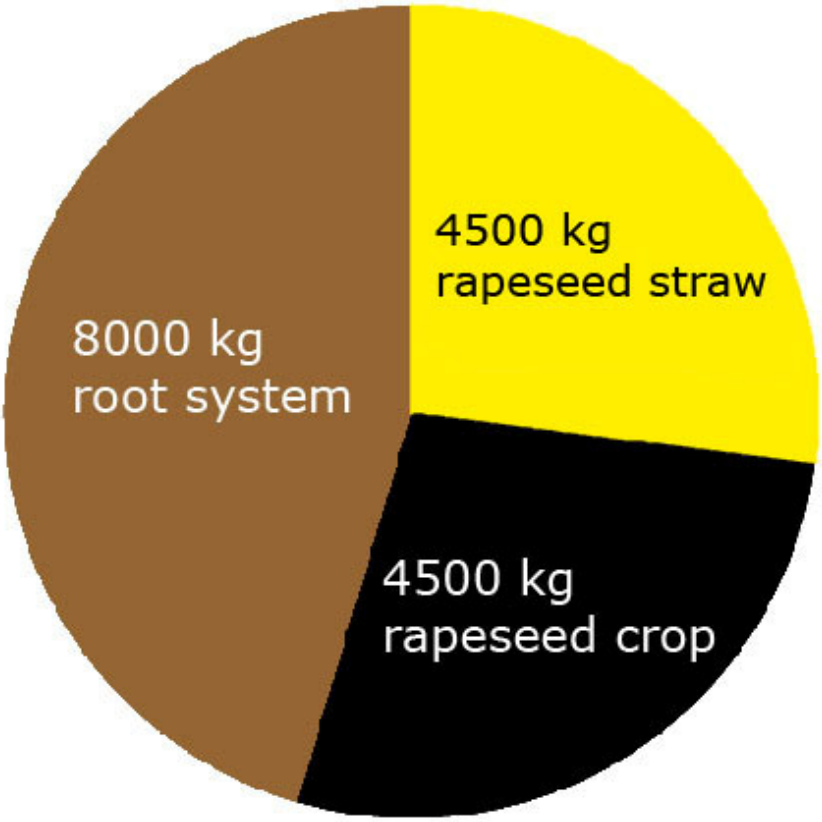
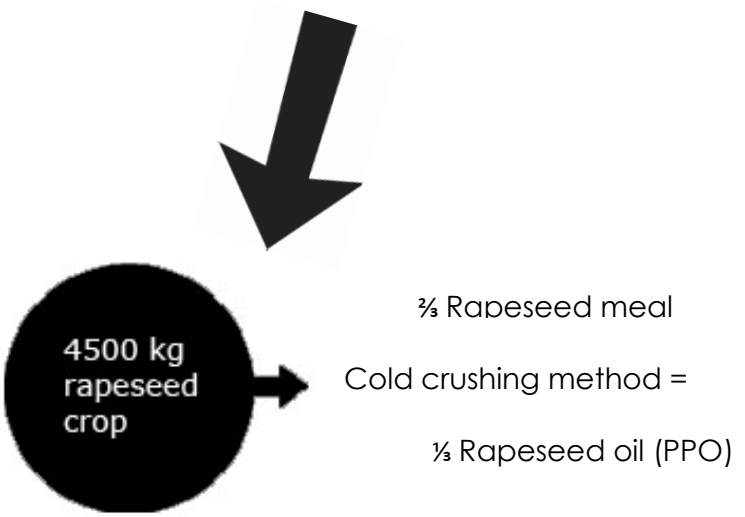
Attachment 1: Rapeseed

Facts and Figures for PPO (Pure Plant Oil).

Total
17000 kg organic dry matter
yield per Hectare

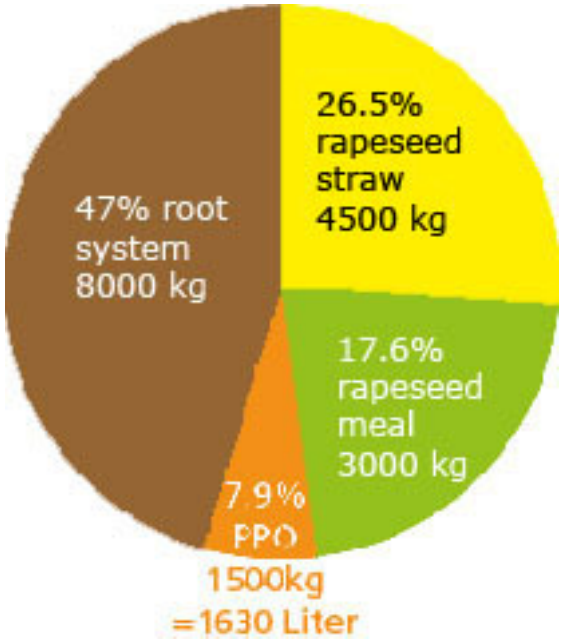


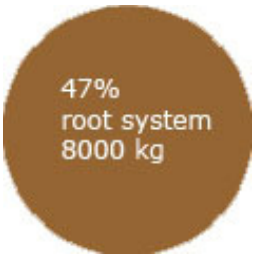


Attachment 1: Rapeseed (continued)

Facts and Figures for PPO (Pure Plant Oil).

1 Hectare Rapeseed =





Remains in the soil after harvesting. The succeeding cultivation is benefiting a production boost up to a maximum of 30 %

Rapeseed straw can be used as stall bedding. The straw, saturated with organic manure, can be spread on the land after harvest. This adds organic fertilizers and carbon to the soil.

Rapeseed meal to be used as feedstock for cattle. The vegetable protein replaces another vegetable protein like soy meal . By spreading the manure derived, the straw returns to the field, and is adding carbon.

After the harvest the only organic product per hectare getting a new identity and to be used as biofuel is PPO. This is less than 8% of the total organic dry matter yield per hectare.

Attachment 1: Rapeseed (continued)

Facts and Figures for PPO (Pure Plant Oil).

SOLAROILSYSTEMS
Facts

ILUC = indirect land use change.
The expression used to make a distinction between the use of crop cultivations, where one crop is to oust another crop. Food crops may be ousted by other crops, e.g. crops for bio fuel production.

Every hectare rapeseed or sunflower cultivated in NL or in the EU replaces a minimum of 1,5 hectares imported soybeans from South America in terms of land use. Moreover, these soybean cultivations are often genetically modified. Monocultures, like soybean cultivations, increasingly appear on former forest land and/or future forest land designated for agricultural purposes. The European rapeseed and sunflower cultivations can offer an alternative and replace the imported supply of vegetable protein derived from soybeans.

Rapeseed and sunflower cultivations in NL and the EU can in fact slow down the ILUC development. To a certain extend it can help to prevent seizure of land elsewhere on the planet and/or reduce cutting virgin forest as a source for the supply of European protein feedstock.

Rapeseed and sunflower cultivations are subject to crop rotation , often in combination with other food crops like wheat. Both cultivations significantly improve the soil structure and will boost the yield of successive wheat and other cultivations. Both cultivations are so called "preceding" crops. These cultivations support the yield of successive food crops. To implement a "sound" agricultural application, rapeseed or sunflower cultivations should be applied once every 3 to 4 years to improve the soil quality.

As stated earlier, 1 hectare of rapeseed will generate about 8% Pure Plant Oil as bio-fuel. This 8 % equals the size of land the farmer in earlier days would have needed to feed his horse , enabling the horse to work on the land, and to secure the harvest…

The concluding observation shows that this type of bio fuel provides a return of 92% of the organic dry matter to the field where it was harvested previously. In no way it violates ILUC, or food for fuel issues, or does it confirm other objections launched by bio-fuel opponents. A great number of bio-fuels presented as 2nd. Generation bio fuels, will generally need the total yield of crops to process it to bio fuel. As a result, a serious depletion of biodiversity and soil structure will occur, and more fertilizers will be necessary to restore the balance of minerals and nutrients in the soil.
Approximately 2,5 % of the arable European fields , with cultivations of rapeseed and sunflower is sufficient to replace all imports of soy for the European protein feedstock .

It will certainly reduce the ILUC factor, and will produce as much Pure Plant Oil for bio fuel purposes to replace the total quantity of diesel oil currently used in road transport in the Netherlands and Belgium.

Attachment 1: Rapeseed (continued)

Facts and Figures for PPO (Pure Plant Oil).

SOLAROILSYSTEMS
Numbers

EROEI (=Energy Return On Energy Investment)

Energie-balans
To cultivate 1 hectare rapeseed, a certain amount of energy is required. For plowing, sowing, harvesting, crushing the seed to PPO using a so called "cold pressed" method, i.e. a full processing program (from Well to Wheel) one needs 112 Liter fossil Diesel Oil or PPO for fuel.

To process 4500 kg of rapeseed (= yield per Hectare), 30 kW/h per ton of rapeseed is needed, a total of 135 kW/h.

112 liter diesel + 135 kW/h (= 30 liter diesel equivalent basis Co-generation)
= total use per hectare = 142 liter diesel providing 1630 liter PPO = 1590 liter dieselequivalent
3000 kg rapeseed meal = 0,57 liter/kg diesel oil equivalent = 1710 liter dieselequivalent
4500 kg straw = 400 liter diesel equivalent
+

Total:
Investment: 142 liter diesel Return in energy = 3700 liter diesel equivalent

The root system/humus/biomass part remaining in the soil after rapeseed cultivation, has not been considered, although it will support and contribute to a higher yield for the successive crop. However, it would additionally contribute to a higher energy output as now established as follows:

1 unit (renewable) energy of investment will generate 26 units of non-fossile energy. The EROEI for fossil oil worldwide equals 1 unit of input to generate 3 units of fossil fuel.

CO2 balance or environmental balance
The European Union's assessment for the reduction of "warm crushed" PPO indicates 57% CO2 reduction in comparison with diesel oil fuel. For "cold crushed" Pure Plant Oil, this reduction may exceed 80%, depending on the cultivation procedure. This can be certified through accreditation.