This testimony is to clarify confusion about the production and marketing of vegetable oil crops in the Willamette Valley (WV) of Oregon. As a professional Agronomist, I have worked with canola and other oilseed crops in Oregon for more than 35 years.

Description of the World Oilseeds

Vegetable oil, a worldwide commodity, is produced through the cultivation of several different crop species. Shown in Figure 1 is the contribution of various crops to world vegetable oil production. Three crops, palm, soybean and, and oilseed rape (canola) account for over 80% of the world production. Numerous facilities for handling, crushing, oil refining, and meal processing are located throughout major production regions. These facilities have large economies of scale and nominally handle, crush and process 1000 to 2000 tons/day. Several multi-national companies operate facilities around the world. One example is Viterra https://www.viterra.com. Among its many crushing facilities is a 1100 ton/day plant at Warden, Washington where Oregon grown canola would be marketed.

Oilseed crops such as sunflower, peanut, cotton, olive, flax, and several others not shown make up the remaining 20 % of world production (Figure 1). All the minor oilseed crops can be considered niche crops. They are grown in specific areas for specific end uses. Local handling and processing facilities have been developed to store, process, and market these on small local and regional level, no such facilities for these exist in Pacific Northwest.

World consumption and use of vegetable oil mimics world production (Figure 2). Supply and demand dictate the prevailing price for whole seed, refined oil, and protein meal. Briefly whole seed is crushed to express the oil, the remaining solids known as meal are livestock feed. Canola is a desirable oilseed because of its high oil content (about 40%) and the high-quality meal it produces. Soybean has an oil content of about 20% and is an excellent meal.

The term canola was introduced by Canada for rapeseed that had low erucic acid content in the oil and low glucosinalate content in the meal. It was first developed by Canadian plant breeders Baldur Stefansson and Keith Downey in 1974. Canola is a contracted word for Canada oil low acid. Canola is produced on the species *Brassica napus* and *Brassica rapa*. In the US near all canola is *Brassica napus.*

Canola China, India, Canada, and the EU are world leaders in vegetable oil produced from canola or oilseed rape as it is called in the EU (Figure 3). The US produces much less than these world leaders. The US must import canola seed to satisfy canola crushing facilities in the US. Also, the total canola oil crush in the US is not sufficient to meet domestic demand, so in addition of seed the US imports canola oil from Canada. Both US and World demand for vegetable oil is expected to increase over the next decade and beyond. Maintaining and increasing production in the US is needed to stabilize price for producers and consumers and ensure the US meets its own food needs. Note that palm oil is grown in mostly near the tropics in in Malaysia and Indonesia. It is produced from the mesocarp (reddish pulp) of the fruit of perennial oil palm *Elaeis guineensis*.

While corn is not considered an oilseed, corn oil is a marketed vegetable oil. Corn oil is a by-product of the wet milling of corn for products put into the human food chain. Corn starch, corn germ, corn gluten (protein), corn syrup and high fructose corn syrup are all major food ingredients. Corn oil is one of the products in the separation of these components.

Agronomic Potential of Oilseed Crops in the Willamette Valley

Several oilseed crops can potentially be grown in the Willamette Valley WV these include camelina, soy, rapeseed, , flax, sunflower, and safflower. In addition, brown mustard and yellow mustard can be grown. While mustards are oilseed, their end use is condiment mustard. Instead of crushing the seed, the whole seed is ground for consumption.

Soybean

Except for soybean, all these oilseeds have small and inelastic market. Extensive production of any of these would drop prices below the cost of production. Soybean is produced on over seventy million acres in the US. The Willamette Valley cannot compete in this market because of our climatic conditions and lack of adapted cultivars. The Mid-West US has average yields of 60-70 bu/acre or more. Such yields are unattainable in the WV given the climate and the lack of suited varieties. Most soybean lines are traited (GMO) lines produced by seed companies that are not invested to develop lines for the WV.

Camelina

The yield potential of camelina in the Valley is lower than most other crop. From an economic standpoint the returns from camelina could not compete with other crop such as wheat, canola, and grass seed. Results of camelina trials can be seen at this site https://www.semanticscholar.org/paper/Camelina%3A-Seed-yield-response-to-applied-nitrogen-Wysocki-Chastain/ce9f621210a7b49d80a584197e2dc73398e75d31

Yields at Corvallis in this study were 1000 to 2000 lb/acre, these yields and current price of camelina do not compare with higher returns for other crops.

Also, private companies that are developing and contracting camelina will not encourage camelina to be grown where the crop would be displacing other crops. This has to do with the carbon life cycle analysis for the crop. Camelina has an advantage as a feedstock for renewable diesel because of its low calculated carbon footprint. It has a preferred status over other oil seeds because the contracting companies only choose for it to be grown on summer fallow acres, which means it is not displacing other crops. Displacement is used in the carbon life cycle analysis.

Also, camelina oil does not have GRAS (recognized as safe) status with FDA, therefore no food companies can place it into the human food chain. There are exceptions for small scale cold press oils, but that is a tiny market and must be done by individuals. Camelina is quality oil for several human end uses, but it would take a major campaign by producers and processers to achieve GRAS. For all these reasons camelina is not a viable economic nor agronomic crop for the WV.

Sunflower, Safflower

While the agronomic of these crops fit the WV, the economics do not. Flax, sunflower, and Safflower are developed crops in other areas of the US. It is feasible to grow these crops because processing facilities have developed over time where these crops are grown. Because of processing proximity costs for freight, handling and processing are competitive. The WV lacks such processing resources. Sunflowers are grown on a limited basis in Oregon, for the birdseed industry, but this market is very inelastic and would soon be saturated if more than a limited few were to grow them. The nearest sunflower processing and crushing facilities are in Colorado or Kansas and in North Dakota. There is a chicken and

egg dilemma, in that if large enough acres existed, then large scale rail transport would be feasible. Also, growers lack adequate production practices and row crop equipment to grow flowers without additional investment.

Flax

Similar problems exist for Flax. No close processors, lack of production practices and significant freight cost to existing processors and limited market.

Yellow and Brown Mustard

Yellow mustard and brown mustard are viable in the region but have very limited markets and are always grown under contract. Companies that contract mustard contract for the first 800 lb/acres for a fair price, but additional yield trades at market price. The first 800 lb. guarantees the needs of the company. Anything above becomes the risk of the farmer. The company protects its needs, and the farmer takes the risk above the first 800 lbs. If the market price drops the farmer assumes that risk in these types of contracts. The security for the farms is the base price for the first 800 lb/acre. Economically, this cannot compete with other crops. There may be rare specialty opportunities, but that would benefit only a few producers.

Summary

Many oilseed crops can be grown on the WV; however, they all have limited application because processing facilities are lacking and freight to distant processors is expensive. Canola is the only crop that has an extensive elastic market and reasonably close processing facility and high yield that ensures a competitive return per acre.

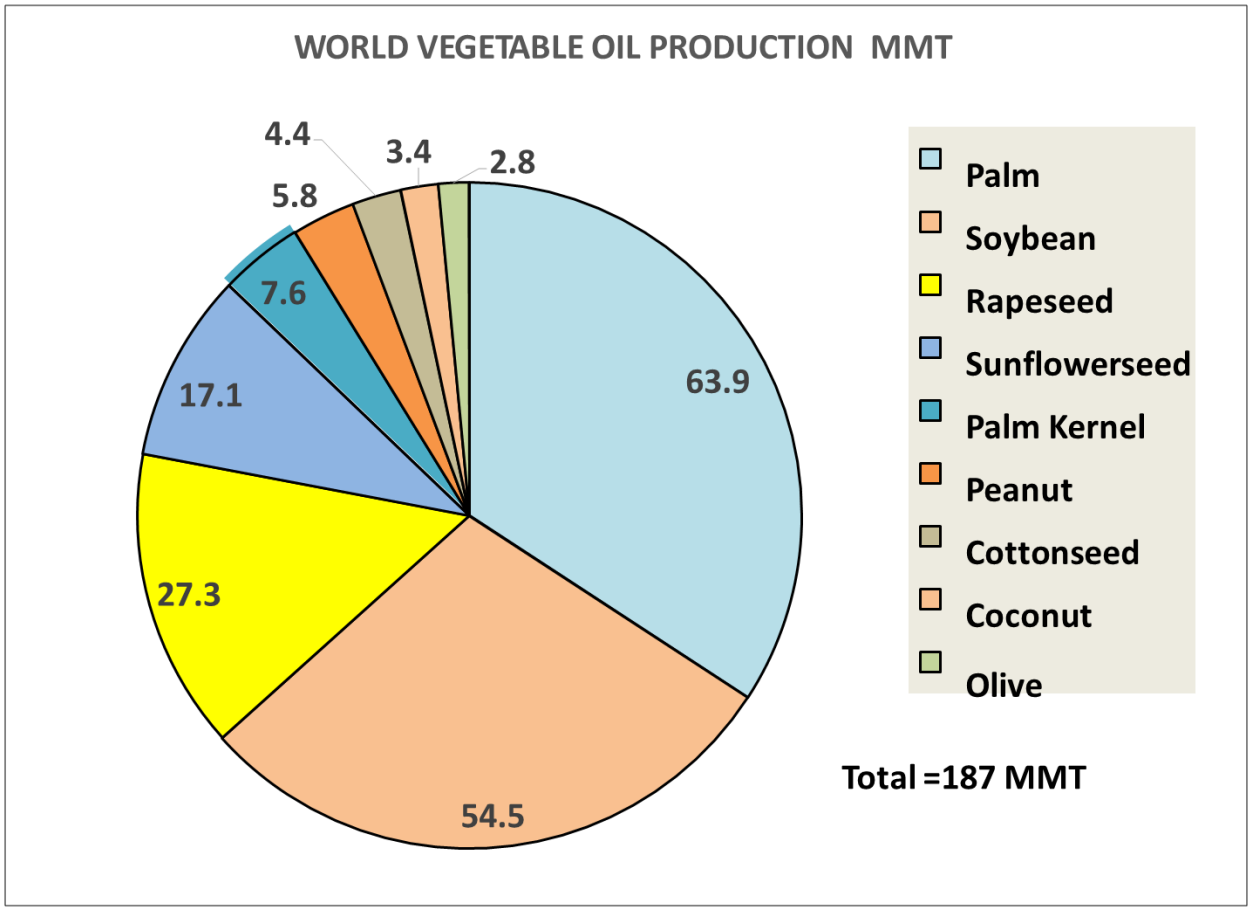

Figure 1. World vegetable oil production by crop.

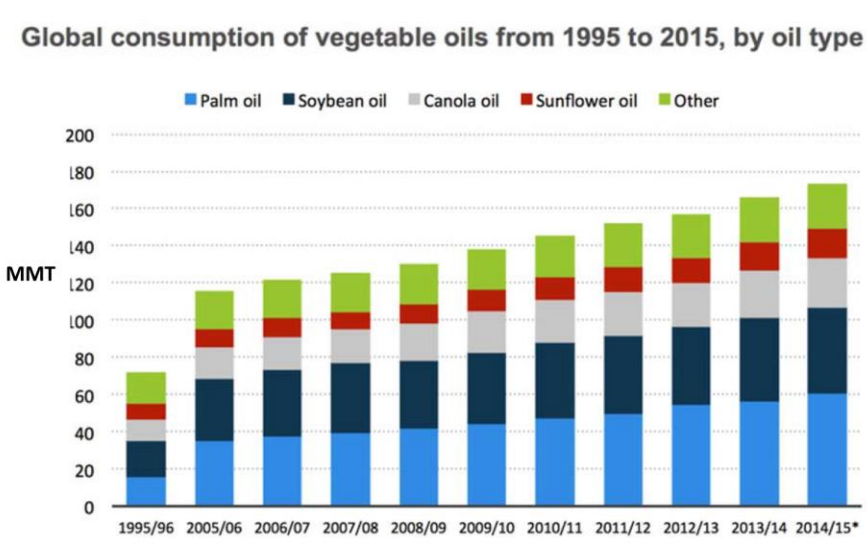

Figure 2. Consumption of world vegetable oil

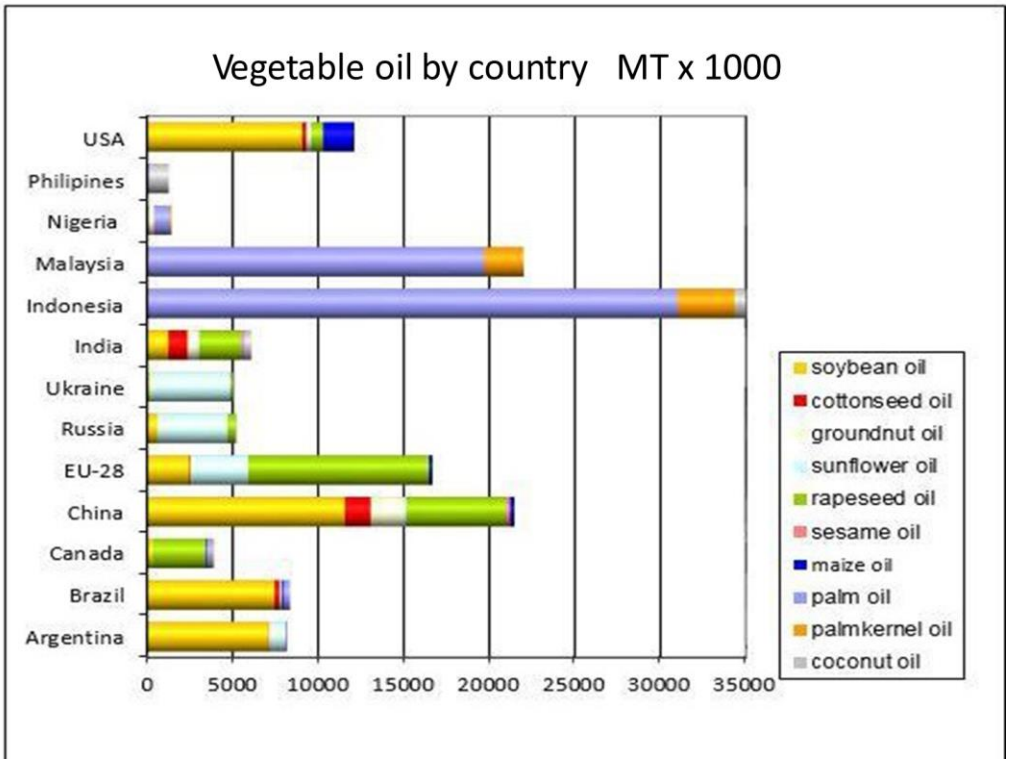

Figure 3 World vegetable oil production by country.

Need for Rotation Crop in the WV

Conventional family farms in the WV are desperately in need of broadleaf rotation crop in grass seed production systems. A broadleaf crop provides rotation benefits to following crops, allows the use of different chemistries in herbicide choices and improves soil health. Canola is an ideal rotation crop. It lessens weeds and diseases in grass seed and cereal systems. Canola residue is higher in nitrogen content than grass or cereal crops. Thus, the rate of residue decomposition is more rapid, and nutrients are released to benefit the following crop. Putting canola in the rotation will allow producers to use herbicides that can control weeds that are developing resistance to herbicides typically used in grass seed and cereal production. The importance of this cannot be overstated. Having new herbicide chemistries available helps control problem weeds and extends the life of current chemistries. Adding canola to the cropping system diversifies the system. Canola has its own unique root microbiome, which contributes to better soil health and nutrient cycle.