

# **Canadian Export Potential of Nepalese Flax Straw and Fibre**

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### **Introduction to Flax:**

*Linum usitatissimum*, commonly known as flax or linseed is a low input oilseed valued for its nutritional qualities, profitable economic implications for farmers and the management of disease and insects during crop rotation [6]. Likely having originated in the eastern Mediterranean and India, linseed is both a food and fibre crop, is considered to be cold tolerant and has a shallow rooting system [5]. Flaxseed oil is high in alpha linoleic fatty acid (ALA) of which is important to human and animal nutrition [1]. By-products of flax production such as whole straw and fibre are also highly valued [5]. Following the harvest of oilseed flax, there are resultant stem fibers [1, 6]. Whole flax straw is historically left in the field to decay over time or raked into piles and burned as it tends to clog farm equipment and thus makes collection difficult [1]. Flax fibres can be further processed into numerous end products such as textiles, pulp sweeteners, insulation or flax shives [1].

### **Growing Conditions:**

The production of flax and other oilseed crops peak in the temperate climates of the middle mountain and hill farming regions in Nepal [5]. Flax matures in approximately 90 to 125 days and develops most rapidly under the cool, short-season of growing. The middle hill region of the Lamjung district, also the epicenter of the earthquake devastating Nepal in April of 2015, exemplifies an ideal climate for flax production experiencing consistently cool temperatures for most of the year [4, 5]. The shallow rooting system makes the plant especially susceptible to drought and excess moisture in the soil but also easier come time to harvest [1]. Most cash crops are grown in the hill regions of Nepal as this is where two thirds of the subsistence farmers reside whom need to produce just enough food to feed themselves and their families [4, 5].

### **Production in Nepal:**

Oilseed production in Nepal was largely replaced by grain crops which contain a higher caloric value but requires higher labor and overall decrease in nutritional quality for the Nepalese [5]. Flax production is seen to be increasing as Nepal's reported yields in 2012 are 5000 Hg/Ha and 5358 Hg/Ha in 2013 referring to a production quantity of 7500 tons and 7672 tons respectively [2].

### **Benefits to Nepalese Agriculture:**

Entering flax into the crop rotation reduces the prevalence of disease and pests as flax varieties are less susceptible to diseases such as Sclerotinia stem rot, flea beetles, and certain species of Fusarium that devastate cereal crops [1]. Further utilization of flax production will not only increase the yields of other grain cash crops but also provide Nepalese farmers with by-products for personal use or sale [1]. Whole flax straw holds great agricultural value to subsistence farmers. When left on the field, the straw will protect the soil from wind and water erosion and can also be used as livestock bedding or mulch [1]. Due to the topography of the hill and mountains, run-off and erosion is of concern where whole flax straw can help to alleviate and reduce the occurrence of this erosion [1, 4, 5]. Additionally, remnants of the straw and fibre remaining on the soil will return nutrients to the soil in hopes of increasing soil fertility and in turn increasing future cash crop yields [1, 4]. The flaxseed itself can be consumed by the population and with its' short maturation period and self-pollination, the crop can produce multiple cuts of straw and seeds [1]. A versatile crop, the flaxseed can be used in breads and cereals as well as oil for supplementation [6]. Lastly, deforestation for fuel use is an ongoing issue in Nepal [5]. Considering that by-products of flax harvest are already used as biofuel source in Canada, this methodology can be transposed in Nepal and lessen the need for hill and mountain farmers to scavenge for wood sourced fuels [1, 5].

### **Economic benefits to Nepalese Subsistence Farmers:**

There is world market demand for flax straw and fibre use in environmentally friendly products, textiles and biofuel [1]. Canada is the number one exporter of linseed, exporting 359112 tons of linseed in

2011 [2]. Consequently, Canadian farmers often maximize their cash returns in producing quality seed and neglect the production of whole straw and fibre; an excellent opportunity for Nepalese farmers to fill the niche market within Canada [1]. Canada's number one export ranking suggests there is a global market for flaxseed and because Nepal currently exports other commodities it is logistically possible for Nepal to also export the seed itself in combination with the whole straw and fibre [2]. The cool and temperate climate of the mid-hill regions in Nepal present a great potential for farmers to maximize their linseed yields and in turn the yield of other cash-crops through disease and pest control [1].

### **Possible drawbacks to Nepalese Farmers:**

Harvesting whole flax straw and fibre can be a challenge [1]. Because subsistence farming in Nepal is lacking in agricultural technologies, the labor involved with harvesting the straw and fibre may be the greatest challenge to overcome [5]. It is likely easier to control the speed of a combine from an automated tractor in Canada than to adjust the speed of an animal driven plow when collecting the whole straw byproduct left behind from flaxseed harvest. As a result, harvest and post-harvest labour may be lengthy and time consuming if the straw and fibers are constantly clogging the discs of the plow [1]. Another challenge will be the transport and storage of the flaxseed once harvested [1]. Purchasing price from Canadian manufacturers and processing plants is largely dependent on quality [1]. Although the climactic regions of Nepal are ideal for flax production, spoilage may be an issue with increased temperatures and humidity that may be associated with transport and time of season [1, 4, 5]. Transporting the materials to Canada is going to come as a cost to Nepalese farmers and ultimately determines the profitability of the linseed crop to the farmer [1].

### **Export Potential to Canada:**

Schewitzer-Mauduit Canada in Winkler, Manitoba extracts fibres from the whole flax straw for use in the production of plastic composite products such as insulation and paper cigarettes as well as shive extraction destined for bio-fuel, mulch and animal bedding [1]. Shive is the non-fibre parts of the stem

and comprises anywhere from 70-85% of the total straw weight and therefore a major by-product of flax straw processing [1]. Schweitzer-Mauduit Canada is recorded paying \$5-10 CAN dollars per ton of straw and annually processes 80 000 to 120 000 tons [1]. With flax fibre exports totaling \$8-18 million CAN dollars, there is an emerging market for flax fibre and shive that has the potential to increase in market value as quality and supply rises [1]. Once exported to Canada, whole flax straw can be used as biofuel where there are smaller Canadian processing plants scattered mainly across Western Canada [1]. Flax fibre can be used in textiles such as linen and cottonized flax, in pulp sweeteners as well as insulation where there is remarkable demand [1]. Environmentally friendly products are becoming more and more popular around the world in Canada [1]. For example, there is an increased margin of demand for flax fibre plastic composites to replace fiberglass [1, 3]. Plastic composites using flax fibers are continuing to become more popular in the modern world's automotive industry [1, 3]. Productions of composites require less energy than fiberglass to process and manufacture which results in a lighter vehicle that is more efficient and less costly [1, 3]. The potential for the bi-lateral trade of Nepalese flax whole straw and fibre exists and will continue to grow as the niche market for these products grows within Canada and across the globe [1, 2].

**Canadian Contact Information:**

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## **References**

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