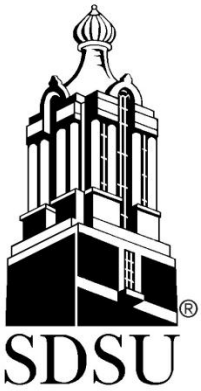
Staff Paper 2015-1 **August 2015**

Economics Staff Paper Series

Risk Management Considerations for Camelina and Carinata

by

Matthew A. Diersen and Sumaiya Saleh



Department of Economics
South Dakota State University

Risk Management Considerations for Camelina and Carinata

Abstract

Relatively new crops pose a challenge to growers and agribusinesses. While they would explore returns from new crops, adoption may mean giving up risk management tools inherent with growing established crops. The oilseed crops camelina and carinata are discussed in the context of the ability to insure them in South Dakota. Camelina (Camelina sativa) is currently insurable in portions of Montana and North Dakota. While carinata (Brassica carinata) is not insurable with a stand-alone policy, coverage was available in Montana and North Dakota in 2015 under the canola policy as a rapeseed type. Processor contracts are often a necessary condition for insuring these crops. The trade-offs of existing coverage and potential changes are examined for camelina and carinata from the perspective of a grower outside the existing coverage areas. In the absence of standard coverage, growers may choose to self-insure, obtain single-peril coverage (e.g., hail), or seek Noninsured Crop Disaster Assistance Program (NAP) coverage. Written agreements for camelina are not available, but NAP coverage may be feasible. For carinata, growers may explore written agreements for coverage under a canola policy.

Keywords: crop insurance, oilseeds, written agreements, yield history

JEL Codes: Q13, Q16, G22

This paper was prepared as part of an SDSU Agricultural Experiment Station project titled, "Agronomy, Processing, Meal Utilization, Economics, and LCA of Ethiopian Mustard (Carinata) and Winter Camelina as Alternative Oilseed Crops for South Dakota", funded by the South Dakota Oilseeds Research Initiative (SDORI).

Matthew A. Diersen (matthew.diersen@sdstate.edu) is a Professor and South Dakota Wheat Growers Scholar in Agribusiness Management and Sumaiya Saleh is a graduate student, both in the Department of Economics at South Dakota State University. Contact Author: Matthew A. Diersen, South Dakota State University Box 504, Brookings, SD 57007.

Introduction

Interest in biofuel crops comes from several areas. Growers are looking for crops that use limited resources, diversify rotations, utilize fallowed land, and provide competitive returns. Policymakers are looking to assure energy security and to provide balanced support to different sectors. Industry partners are looking for new ventures. Of interest locally are two oilseed crops, camelina and carinata, with different adaptability to and potential insurability in new areas. Both crops were grown in field trials and demonstration plots in South Dakota in 2014 and 2015.[1] The crops highlighted here have been analyzed from several perspectives. The feasibility of a crop, adoptability by growers and end-users, and economies of size for processing are key aspects.

The investment in biofuels is substantial. Fuglie et al. (2011) estimate that global research and development in the sector totaled $1.47 billion in 2009. While the supply chain was dominated by ethanol production, biodiesel from various feedstocks has been increasing. Biodiesel production is common in the U.S. and Germany and is usually derived from first generation feedstocks such as rapeseed and soybean. The supply chain includes Abengoa, Poet and ADM in biofuels and Neste Oil with technology spending on vegetable oils.

As oilseed crops destined primarily for biofuel production, the Renewable Fuel Standard policy is also relevant. McPhail, Westcott and Lutman (2011) provide an overview of RFS2, where there were mandates for both advanced biofuels and biomass-based diesel, commonly referred to as biodiesel. Soybean oil is the dominant source of biodiesel and there is excess capacity for biodiesel production in the U.S. Biodiesel is a major component of U.S. soybean oil disappearance, constituting about 20% of use[2]. Other oilseeds can be used to guide the insurance and market value components

[1] Source: Kathleen Grady, e-mail message to authors, May 29, 2015.
[2] Source: Economic Research Service, *Oil Crops Outlook*, various.

necessary to manage risk for these commodities. While a relatively high value (as a percent of total) lies with the oil, meal and hulls would also be factors.

The focus of this paper is on insuring new crops that have limited yield information available. Growers seeking insurance are primarily concerned with a proven yield. Insurance providers are primarily concerned with the loss distribution of the crop[3]. It would be beneficial for both parties to understand the underlying crop yield distribution, especially characterization of the lower tail where insurance losses would occur. Shields (2013) provides a general overview of crop insurance. In recent years crop insurance is seen as the dominant risk management tool for many producers. Growers face a conundrum, needing proven yields to obtain good insurance and needing insurance before building a good yield history.

Processor contracts are often a necessary condition for insuring new or specialty crops, and the popularity of the crops changes with processor activity. Early interest led to camelina production in Montana where plantings exceeded 20,000 acres in 2007 and 2009. While acres in Montana have since waned, Sustainable Oils, LLC, part of Global Clean Energy Holdings, Inc., continues to pursue camelina in the western U.S. In the Northern Plains there is general interest in Carinata from growers and from processors. Carinata was explored as part of the *Mustard 21 Initiative* in Canada that started in 2007. Agrisoma Biosciences Inc. is the private partner developing the genetics (Vakulabharanam, 2012). In 2012 there were 6,600 acres grown in Canada. Agrisoma reported 6,000 acres under contract in 2015 in the Northern Plains, primarily in North Dakota.

[3] Invariably with research into new crops or the insurance thereof in South Dakota, reference is made to "Jerusalem artichoke", a crop with a reputation that its only market was seed for "Jerusalem artichoke".

Camelina Overview

No known commercial production in South Dakota has been dedicated to camelina (Camelina sativa). Thus, there are few risk management tools available other than contracting, with limited provisions for production risk. For growers considering camelina it is important to build a database of planting dates, acres, yields, rotation practices (including fallow), and harvest information. Such a history is paramount to eventually establishing "good farming practices" and yield information that could be aggregated to an insurance pool.

The existing literature on camelina has conflicting results for its feasibility in on-farm settings. Foulke, Geiger and Hess (2012, p. 47) conclude, "It makes it hard to justify growing a marginal crop like camelina when profitability of more mainstream crops provides greater economic returns." In contrast, Keske, et al. (2013) show that it may be feasible to grow, process and use biodiesel from camelina. They simulate results based on assuming camelina is grown on fallowed land (limiting the land charge), with a slight yield drag on wheat that no longer follows a fallow year, and with on-farm or local feed and fuel utilization.

Regionally the crop was popular enough that NASS collected county- and district-level statistics for camelina in Montana for 2007 through 2010[4]. Observed county yields ranged from 100-1,581 pounds per acre on harvested acres. There were unharvested acres in each year, which are important to consider from an insurance standpoint. Montana last reported harvested camelina in 2013 at 1,400 acres with a yield of 370 pounds per acre.

The *2012 Census of Agriculture* was the first to include camelina statistics. In 2012 there were 22 farms nationally with camelina, harvesting 2,056 acres and producing 1,217,370 pounds. Thus, the

[4] Additional statistics may be found at:
http://www.nass.usda.gov/Statistics_by_State/Montana/Publications/croptoc.htm

nationwide average harvested yield was 592 pounds per acre. While much of the production was concentrated in Montana with 8 farms harvesting 1,082 acres, many of the statistics were combined to prevent disclosure conflicts.

The increased acreage coincided with increased interest in insurance coverage. Insurance for camelina was explored using rainfall and vegetation index insurance (Grazingland Management Systems, Inc., 2009). Using small samples from Montana for 2006 through 2008 and from Minnesota for 1970 through 1973, they recommended pursuing the rainfall index coverage. An insurance feasibility study by AgriLogic Consulting, LLC (2011) looked at directly insuring camelina. By then, there were NASS yield data for some counties in Montana for 2008 and 2009. In listening sessions conducted as part of the study, growers were mainly concerned with yield risk. Production contracts fixed the price and did not dock for quality problems. The appendix includes sample contracts by Willamette Biomass Processors, Inc. and Sustainable Oils, LLC, the latter with an Act of God clause. The crop was perceived as less risky than other crops grown in region.

Given the lack of data, AgriLogic Consulting, LLC compared the coefficient of variation of camelina with canola and documented causes of large losses to canola (e.g., drought, heat, etc.). Using observed yields (4 observations from a producer), they calibrated a climate model, then used weather data to simulate a yield distribution. They then calculated insurance premiums and compared them to the observed canola premiums at comparable yield targets. Despite some progress, they state "The biggest problem with insuring camelina production is the lack of information to calculate the farmer's APH or establish transitional yields. There does not appear to be sufficient yield history for the farmer to calculate the APH or establish actuarially sound premium rates." (AgriLogic Consulting, LLC 2011, p. 37).

In a review of COMBO, Coble et al. (2010) stress the importance of the loss experience rather than just the yield loss when developing and monitoring crop insurance products. A grower's insurance coverage level typically depends on a proven yield and the cost of coverage depends on the proven yield relative to the county yield. This is known as the reference yield. The short time frame that farm-level yield data is available coupled with the many factors that cause yield variability combine to make modeling yield losses difficult. They advocate the more common practice of rating the loss experience. Similar data limitations also support modeling or measuring a farm-level average yield instead of an entire yield distribution.

Existing Insurance in Montana, North Dakota and Canada

Spring-planted camelina is insurable under COMBO as an Actual Production History (APH) plan in several counties in North Dakota and Montana (RMA, February 2015). The factsheet lists the counties with coverage[5]. The plan is not at the pilot phase, but is in a distinct class. The coverage is for yield risk. The coverage does not allow for written agreements.

The *Camelina Crop Provisions* defines camelina as "camelina sativa, a plant in the mustard family (Brassicaeae)". Under the plan, November 30 is the deadline for any contract changes such as adjusting the coverage level. As of the 2015 crop year the sales closing date is February 1 as is the earliest planting date. The final planting date is April 20. The late planting period is relatively short, only lasting 15 days, with coverage lowered by 1 percent per day. The end of insurance date is August 31. The coverage does not cover prevented planting. Losses are not covered when caused by weed pressure or chemical damage unless those are caused by other covered losses. The camelina plan does not have any replanting provisions. The only quality provision is for excess moisture.

[5] The RMA Regional Office in Billings provides maps of final planting dates by crop and by county: http://www.rma.usda.gov/fields/mt_rso/2015/final/Camelina.pdf.

The plan includes Catastrophic Risk Protection (CAT) coverage at the 50 percent yield level and APH coverage at the 50, 55, 60, and 65 percent yield levels. The range of APH coverage levels is lower than for COMBO crops. The CAT type is fully subsidized (except for a fee). The price election is only 55% with CAT. The subsidy level for the APH type depends on the coverage level. The plan includes basic and optional unit structures, but not enterprise or whole farm unit structures.

The county actuarial documents contain *Special Provisions*, which break out content by practice and covers new breaking acreage. The transition yields, T-Yields, are the main aspect in the provisions that varies by county. The T-Yields are listed for summer-fallow and continuous cropping practices, the latter being generally lower. When making comparisons to neighboring states, it is helpful to realize that many areas in Montana have URA (unrated land) and that for camelina multiple sub-county areas have different T-Yields. Consider the southeastern most counties in the two states with coverage, Carter County, Montana and Oliver County, North Dakota. In Carter County, the T-Yields for 2015 are 850 pounds per acre for summer fallow and 675 pounds per acre for continuous cropping. However, in other counties the T-Yields are as low as 225 pounds depending on the sub-county area. In Oliver County the T-Yields for 2015 are 900 pounds for summer fallow and 800 pounds for continuous cropping.

The T-Yields vary with the NASS Agricultural Reporting Districts for camelina. In Montana the highest 2015 T-Yields range from 750 to 900 pounds per acre for summer fallow and from 600 to 725 pounds per acre for continuous cropping. However, at the sub-county area there is a wider range of T-Yields across the districts. For the continuous cropping practice, shown in figure 1, the full range is from 225 to 725 pounds per acre in Montana. In North Dakota, there is coverage in the Northwest and West Central Districts. The T-Yields are common across those counties at 900

pounds per acre for summer fallow and 800 pounds per acre for continuous cropping, the latter shown in figure 2.

Figure 1. Range of 2015 Camelina T-Yields for Montana (pounds per acre).

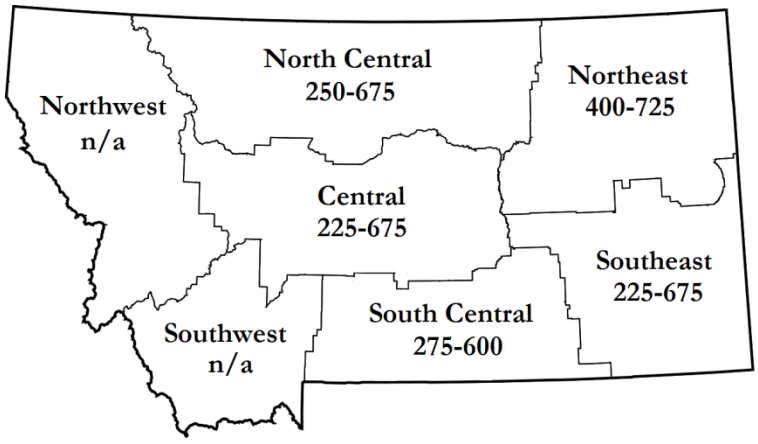
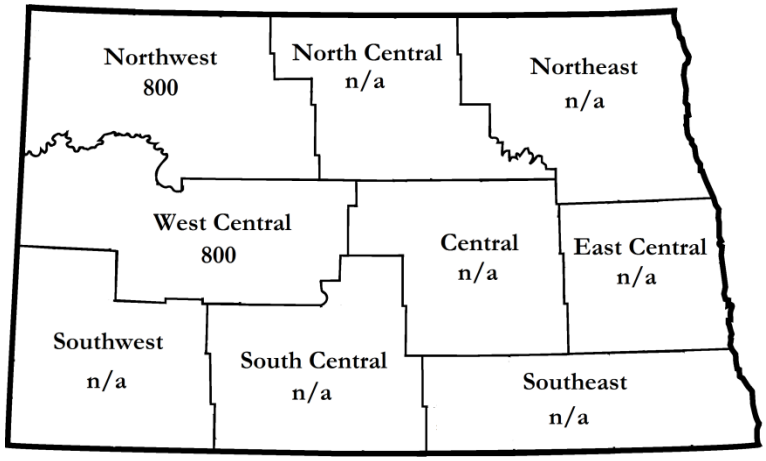


Figure 2. Range of 2015 Camelina T-Yields for North Dakota (pounds per acre).



Major program crops have well defined price election levels documented in the *Commodity Exchange Price Provisions* (CEPP). As a minor crop, camelina does not have a documented way to discern a price election. The special provisions give a contract maximum. Any contract price below that maximum can be used as a price election. Camelina is subject to the *Contract Price Addendum* where the maximum is set administratively by RMA. The maximum was set at $0.16 per pound in 2012 and

at $0.18 per pound for 2013, 2014 and 2015. The contract price can be either a given base price or a given method to determine the base price.

Use to date of camelina insurance has not been extensive. In 2012 there were 38 policies sold, but only 3 policies earned premiums. The policies covered 604 acres with $34,321 in liabilities, $6,035 in total premiums, $3,561 in subsidies and $6,798 in indemnity payments. In 2013 there were only 4 policies with earned premiums, covering 396 acres with $22,301 in liabilities. The coverage per policy ranged from $21.89 to $75.46 per acre. All of the policies in 2012 and 2013 were buy-up coverage at the 65% yield election level. The insurance was spread across the following Montana counties: Blaine, Hill, Liberty and Phillips.

Coverage for camelina is available in Canada. The coverage is administered by the Saskatchewan Crop Insurance Corporation. The coverage is comparable to aspects of COMBO policies in the U.S. and is documented in SCIC (2015). Under the *Contract of Insurance 2015*, there are *2015 Terms and Conditions: Camelina*.[6] Good farming practices for the U.S. may be informed by recommendations on weed control, herbicide residue, and targeted plant populations. The SCIC insurance requires a minimum plant stand (e.g., 120 plants per square yard). Yield coverage is offered at the 50, 60 and 70% levels. Coverage is based on the provincial average yield and the final planting date varies from May 21 to June 20 depending on the location. There are no quality adjustments tied to losses.

Obtaining Camelina Coverage in Other Areas

In discussions with crop insurance agents and the Risk Management Agency, camelina coverage would have to be expanded or the policy modified to have coverage in other areas, such as in South Dakota. The restriction on written agreements is a constraint. One approach is to contact the

[6] The camelina terms are available at: http://www.saskcropinsurance.com/files/ci/2015Camelina_TC_2015.pdf. The referenced production information, "Camelina Farm Facts" are available at: http://www.agriculture.gov.sk.ca/.

developer and suggest an expansion of the policy[7]. Another approach is to petition the relevant RMA Regional Office for a change to the policy. Both approaches would be strengthened with documentation of the number of acres likely to be insured, yield histories, and market interest both in growing the crop and in buying the insurance. Following the existing coverage, yield history will also depend on whether the crop followed a summer fallow or continuous cropping practice.

Without an insurance policy available, growers can explore the use of Noninsured Crop Disaster Assistance Program (NAP) coverage. The 2014 Farm Bill authorized expanded price and yield coverage levels under NAP (Farm Service Agency, 2014). The NAP *Basic Provisions* identify commercially produced industrial crops, "for renewable biofuel", which would seem to encompass camelina. NAP has no replant provisions, no revenue protection and single units for a county.

Growers would need an approved yield, or an APH-calculated yield to obtain coverage. Generally, this requires four years of production history or the use of T-Yields. A grower could use 65% of the T-Yield to begin building an APH. With additional years of actual yields, the actual yields are used in place of T-Yields and the percent of T-Yields increases. Where there are no T-Yields available a reference T-Yield would need to be identified[8].

Under the 2014 Farm Bill, NAP coverage levels are now available with up to 65% yield coverage and up to 100% of price coverage, the same as in the camelina policy. The NAP premium is calculated as the commodity price times the coverage level times the APH times 5.25 percent. In the event that yield is reduced the grower files a notice of loss. To put the NAP coverage and cost in perspective, consider what growers paid for coverage in Montana in 2012. All of the policies happened to be at the 65% coverage level, while the contract prices and proven yields are unknown. The average

[7] Attempts to contact the developer have been unsuccessful.
[8] Camelina coverage parameters under NAP can be found for South Dakota counties at: http://fsa.usapas.com/NAP.aspx

liability was $68.25 per acre while the average premium paid (after the subsidy) was $4.10 per acre. The outlay or effective premium rate was thus 7.2 percent of the liability.

Production evidence and good farming practices are emerging with research and field trials in South Dakota. Grady and Nleya (2010) provide general production information for South Dakota. Test plots in Brookings, South Dakota for 2007, 2008 and 2009 had yields ranging from 722 to 1,476 pounds per acre. Plots in Wall, South Dakota for 2005, 2006, 2007, and 2009 had yields ranging from 81 to 702 pounds per acre. There is also some additional information in the RMA's *Camelina Loss Adjustment Handbook*. Good farming practices may be augmented with any processor contract requirements.

Carinata Overview

Carinata (Brassica carinata), also called Ethiopian Mustard, shares features with canola, rapeseed and yellow mustard. However, the related crops are not prevalent in South Dakota. In the *2012 Census of Agriculture*, there were 1,452,355 acres of canola in North Dakota and 663 acres in South Dakota. Across the U.S. there were only 2,759 acres of rapeseed. Some of the limited state-level information for rapeseed was obscured, but acres were generally listed from North Dakota out to California along with a farm in North Carolina. Mustard was not broken out by state.

In early work looking at canola risk, Flaskerud, Wilson and Dahl (2002) found that hedging canola was effective using contracts of the Winnipeg Commodity Exchange (now ICE Canada Futures). A hedge ratio below 1.0 could be effective, as could selective storage. A recent study of canola contracting by Wilson and Dahl (2014) does not include crop insurance.

Agrisoma Biosciences Inc. has a branded carinata variety which they market as seed. They have a joint venture with Paterson Grain (PGF Biofuels) to merchandise the harvested oilseed crop. There

is also a management guide for Northern Plains producers (Agrisoma Biosciences Inc., 2015). In any production contract, the provisions would augment good farming practices in any insurance policy. In the fall of 2014 there was contracting of carinata that exceeded 3,000 acres in Florida with yields of 3,000 pounds. The contracted price was $8 per bushel with no dockage[9]. Contracts in 2012 were $12.50 per bushel plus $40 per acre[10]. Anecdotal evidence suggests that total acreage in Canada has exceeded 10,000 acres of cumulative production in recent years.

Growers had been exploring the use of written agreements for carinata in Montana and North Dakota under existing canola and mustard policies. Written agreements can quickly become labyrinths. The canola standards, however, state that its "oil shall contain less than 2 percent erucic acid."[11] Similarly, the mustard policy does not specify types beside yellow or brown. In addition, the mustard policy explicitly excludes Juncea Canola (Brassica Juncea). Neither policy was ideal for covering carinata. Ultimately, RMA issued an informational memorandum on March 4, 2015 that allowed for coverage of carinata as a spring high erucic rapeseed type of canola[12]. The allowance was only for the 2015 crop year. The RMA issued an informational memorandum on July 13, 2015 applicable to carinata beginning with the 2016 crop year[13]. Carinata coverage can be obtained with a written agreement on the canola policy. Nationally, counties with canola coverage encompass counties with mustard coverage.

[9] Hollis, P. "New crop "carinata" holds promise for Southeast." *Southeast Farm Press*, Penton, March 1, 2015.

[10] Cross, B. "Agrisoma reaches carinata deal with biofuel firm." *The Western Producer*, posted April 4, 2013.

[11] Subpart C – United States Standards for Canola (Effective February 1992).

[12] Bashore, E. "Insuring Carinata (2015 Crop Year)." Informational Memorandum, Risk Management Agency, USDA, March 4, 2015.

[13] Witt, T. "Insuring Carinata for the 2016 and Succeeding Crop Years." Informational Memorandum, Risk Management Agency, USDA, July 13, 2015.

Existing Insurance

The *Canola and Rapeseed Crop Provisions* provide the following definitions: "Canola is a crop of the genus Brassica" and "Rapeseed . . . that contains at least 30 percent of an industrial type of oil." The policy must be purchased by March 15. Coverage ends October 31. Canola has quality factors to determine insured values, but the rapeseed type is excluded except for excess moisture. Coverage is for yield elections from 50 to 85 percent. A factsheet (RMA, April 2015) gives a basic overview. There are some rotational requirements, written agreements are allowed, and final planting dates vary by county[14]. In southcentral and southwestern North Dakota counties the final planting date is May 15 and in southeastern North Dakota counties it is May 20. Final planting dates increase as one moves north and east. Adjacent to South Dakota, from Bowman to McIntosh Counties, the final planting date is May 15 and from Dickey to Richland Counties it is May 20.

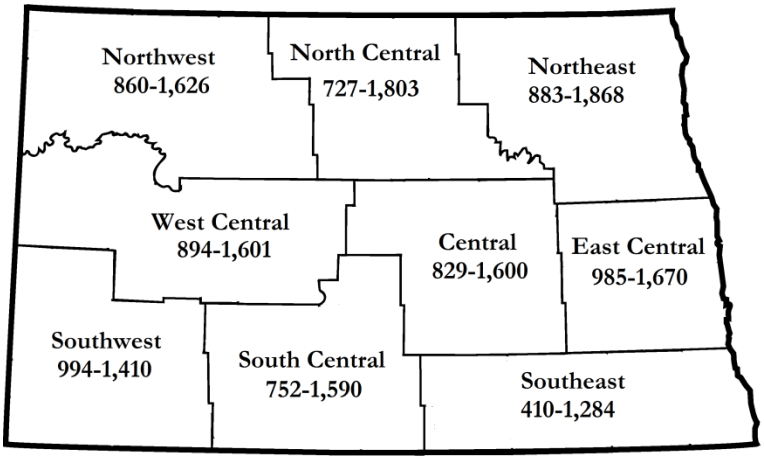
The T-Yields for canola (across types) vary widely across and within counties. The T-Yields shown in Figure 3 are for spring oleic canola. Among the counties bordering South Dakota, the highest T-Yields for the rapeseed type range from 810 to 1,139 pounds per acre. However, at the sub county level there is substantial variation in T-Yields. The rapeseed-type T-Yields are consistently 90% of the spring oleic canola type across North Dakota.

The type distinctions are important between canola and rapeseed. Canola is covered by the *Commodity Exchange Price Provisions*. In North Dakota, spring canola with a March 1 sales closing date is marked to the ICE canola futures price. In February the average of the November futures closes is used with the corresponding December CME Canadian dollar futures closes. The average dictates the Projected Price. The Harvest Price for standard canola types is derived during the month of

[14]A map of the canola final planting dates is available at: http://www.rma.usda.gov/fields/mt_rso/2015/final/Canola.pdf.

September. The rapeseed type, however, is determined based the canola Projected Price, but it does not change. Thus, the Harvest Price is the same as the Projected Price. Using the *Rapeseed Pricing Methodology*, an average of the U.S. rapeseed price is computed as a ratio to the ICE canola futures price. A ten-year average is used to compute a ratio factor, the rapeseed factor, used on the corresponding canola futures price.

Figure 3. Range of 2015 Spring Oleic Canola T-Yields for North Dakota (pounds per acre).



The 2015 canola projected price was $0.161 per pound and the corresponding volatility factor was 0.13. Historic projected prices and volatility levels are shown in Table 1. Spring rapeseed uses a factor of 1.213 to arrive at a projected price of $0.195. For canola, the full range of Revenue Protection (RP) coverage is available. Thus, the harvest price can be used, settling in September. The historic record shows years of both major price increases and decreases between the projected and harvest periods. Basis levels at harvest (shown for North Dakota) also fluctuate reflecting local market conditions and exchange rates.

Without RP benefits for the rapeseed type, it may not make sense for growers to purchase RP. With a processor contract, there would technically not be downside risk, otherwise covered by RP with

the Harvest Price Exclusion (RP-HPE). The potential for a shared profit contract (where higher values are passed onto growers) is thus not facilitated. This leaves Yield Protection (YP) as a choice.

The canola *Special Provisions* give details about processor contracts, rotation restrictions, and crop quality. The late planting period is a narrow 15 days and the pace is accelerated compared to COMBO crops. The coverage is reduced 1% per day for 5 days and then 2% for the next 10 days.

Table 1. North Dakota Canola Insurance and Marketing Factors

	Projected Price ($/cwt.)	Harvest Price ($/cwt.)	Change ($/bushel)	Volatility Factor	September Cash Price ($/cwt.)	Basis ($/cwt.)
2005	9.80	10.10	0.30		9.08	-1.02
2006	10.90	12.10	1.20		10.40	-1.70
2007	15.20	18.80	3.60		15.10	-3.70
2008	29.30	20.90	-8.40		20.60	-0.30
2009	16.00	16.40	0.40		15.50	-0.90
2010	17.20	20.50	3.30		17.40	-3.10
2011	26.30	24.90	-1.40	0.15	23.10	-1.80
2012	23.70	28.90	5.20	0.10	26.50	-2.40
2013	25.00	21.60	-3.40	0.10	20.70	-0.90
2014	18.40	16.80		0.12	15.60	-1.20
2015	16.10			0.13		

Notes: Projected Price is determined in February. Harvest Price would not apply to rapeseed.
Sources: USDA-RMA and USDA-NASS. The cash prices from 2005-2006 are from North Dakota Field Office publications.

The implications for 2016 and forward hinge on the treatment of carinata through the written agreements. In counties with canola coverage the written agreements will be designated TP, or having an unrated practice or type (carinata). As unrated, there remains some uncertainty as to the yield comparability, price or value comparability and the continued need to establish T-Yields for other areas. Presumably, the starting points would be the T-yields and price election for standard canola.

Mustard

The *Mustard Crop Provisions* define mustard as "a crop of the family Cruciferae". There is potential to model carinata coverage after mustard, as brown or yellow mustard can be insured in various counties in Montana and North Dakota (RMA, March 2015). Mustard coverage requires a processor contract, is for CAT and yield losses only (APH plan), and has yield coverage levels from 50 to 75 percent. Mustard does have a cap clause limiting payouts on non-contracted production or on bushels produced in excess of a contract. Mustard has prevented planting and replanting provisions. There are optional and basic units. The sales closing date is March 15 and the earliest planting date is April 14. Contracts are needed to establish a base price. The insurance ends on October 31.

There are quality adjustments for moisture and other specifications, but many would be specific to the non-industrial use of the types currently covered. The types are in the *Special Provisions*. Mustard in North Dakota has a May 20 final planting date in most southern and western counties and a May 30 final planting date in northeast counties[15]. The T-Yield for the yellow type is typically either the same or about 95 percent of the T-Yield for the brown type. The T-Yield is 618 pounds per acre for the yellow type, non-irrigated practice for 2015 in Adams County. The T-Yields generally increase to the north. In Adams County the late planting coverage is reduced by 2% for 5 days and then by 3% for the next 10 days. Thus, the effective coverage is quite low at the end of the 15 day late planting period.

The coverage for mustard, while available, lacks some transparency given the contracting activity. Insured acres of mustard were common in Montana and North Dakota from 2012 to 2014 (Table

[15] A map of the mustard final planting dates is at: http://www.rma.usda.gov/fields/mt_rso/2015/final/mustard.pdf

2). There were also insured acres in Idaho, Oregon and Washington. Yield coverage at the 65 percent or 70 percent levels tend to be the most common, but the coverage levels from 50 to 75 percent have also been used. The total acres insured nationally fell sharply in 2014.

Without any special terms, carinata has been and can be covered in Canada using the "Diversification Option" on normal crop insurance coverage (SCIC, 2015). With coverage of normally insured acres, a producer can elect to insure other crops on up to 30% of the acres in the normally insured total acres. The average of coverage levels, premiums and claims on the normally insured acres are applied to the diversified acres. This option allows a grower to purchase the coverage on emerging crops that may lack a T-Yield. The non-systemic production risk is borne by the grower and not the insurer.

Table 2. Mustard Insurance by States

	2012 (acres)	2013 (acres)	2014 (acres)
Idaho	1,189	1,290	1,351
Montana	17,440	15,112	5,933
North Dakota	15,178	11,393	6,496
Oregon	877	1,061	221
Washington	2,590	2,298	2,025
Total	37,274	31,154	16,026

Source: RMA

Obtaining Carinata Coverage in Other Areas

Without direct coverage in South Dakota and uncertainty about the type available or applicable in North Dakota and Montana, growers will have to work with their insurance agent to establish the appropriate coverage[16]. One approach is to explore a written agreement for coverage. In South Dakota, there are not established T-Yields for canola to use as a comparison. Fundamentally, there

[16] Minnesota also has insured counties, but as of 2015 none with the rapeseed type in the special provisions. The insured counties are in the Northwest part of Minnesota extending down to Traverse County.

is nothing wrong with using T-Yields from other locations to begin to establish coverage. The main concern for a grower would be giving up yield coverage if the yield potential were much higher in their county than in a reference county.

Growers considering a written request for coverage will need an actual production history, a history and evidence that the crop can be grown in the area (RMA, 2014). An issue is the lack of a yield history on a crop that has not been grown and the reference county/area to use to obtain T-Yields[17]. There are two sources for information that provide guidance, the *Written Agreement Handbook* and the *2015 Crop Insurance Handbook*. Specific to written agreements, there are no actuarial documents for carinata, mustard or canola in South Dakota counties. Thus, growers will likely need written agreements with the XC designation.

If a crop has been grown (with proper records) for three years, a grower can establish an APH record. If not, then a grower must show they have grown a similar crop (with proper records) for three years. The determination of what constitutes a similar crop is subject to review by the RMA Regional Office. Evidence of growing a similar crop is used to assess the grower's ability to grow the reference crop. The T-Yield is not on the similar crop, but on the new crop from the reference county. The *Written Agreement Handbook* (2014, p. 89) stresses, "Under no circumstances will the assigned T-Yield be higher than the T-Yield from the reference county".

The markets for rapeseed and mustard are thin compared to the canola market. The market year average prices for rapeseed and mustard are only available at the national level. A comparison of prices for the three oilseeds is shown in Table 3. Neither rapeseed nor mustard is planted on substantial acres (Table 4). Both crops have harvested acres below planted acres and have yield variability.

[17] Edwards (2014) outlines the process for normal crops, but not specifically for written agreements.

Table 3. U.S. Market Year Average Oilseed Prices

	Canola Seed ($/cwt.)	Canola Meal ($/ton)	Canola Oil (cents/lb.)	Rapeseed Seed ($/cwt.)	Mustard Seed ($/cwt.)
2005	9.62	144.27	31.00	14.30	13.50
2006	11.90	150.36	40.57	14.90	13.70
2007	18.30	253.81	65.64	17.70	28.00
2008	18.70	255.23	39.54	25.30	43.80
2009	16.20	220.90	42.88	26.30	30.40
2010	19.30	273.84	58.68	23.40	25.90
2011	24.00	275.13	57.19	27.00	33.60
2012	26.50	331.52	56.17	26.10	35.80
2013	20.60	377.71	43.70	25.10	37.20
2014	17.00	300.00	38.00	34.90	34.80

Notes: 2014 has preliminary MYA prices for the oilseeds. Sources: The oilseed prices are from NASS. The meal and oil prices are from ERS from various sources.

Table 4. U.S. Other Oilseed Statistics

	Rapeseed			Mustard		
	Planted (acres)	Harvested (acres)	Yield (lbs./acre)	Planted (acres)	Harvested (acres)	Yield (lbs./acre)
2005	2,400	2,000	1,500	49,000	44,600	787
2006	1,400	1,000	1,100	40,500	39,200	720
2007	1,600	1,100	1,100	60,000	57,000	608
2008	200	200	1,500	79,500	71,500	577
2009	1,000	900	1,700	51,500	49,800	991
2010	2,300	2,200	1,891	50,500	48,100	870
2011	1,500	1,300	2,177	23,200	21,800	718
2012	2,500	2,300	1,961	51,100	49,700	628
2013	1,700	1,700	1,141	45,000	43,400	846
2014	2,200	2,100	1,233	33,600	31,200	930

Source: NASS.

The longer price, yield and value histories of canola, rapeseed and mustard are shown in Figures 4, 5 and 6. From 1995 to 2004 mustard prices were at a consistent premium to canola prices, on average 138% higher. Rapeseed prices were at a 113% premium to canola during that period. Increased

demand for commodities in the past decade resulted in higher prices, but thinness of the mustard and rapeseed markets led to greater divergence in the price relationship. From 2005 to 2014 the mustard premium to canola increased to 162% and that of rapeseed increased to 133%. The longer-run yield pattern shows a slightly different relationship among the oilseeds. Little change has occurred in the average yield for mustard. Canola yields follow similar annual variability as mustard, but mustard went from 60% to 50% of canola yields across the past two decades. Rapeseed is more variable, especially during the past decade, and rapeseed yield went from 95% to 101% of canola yield.

Figure 4. U.S. Market Year Prices, Select Oilseeds, 1995-2014

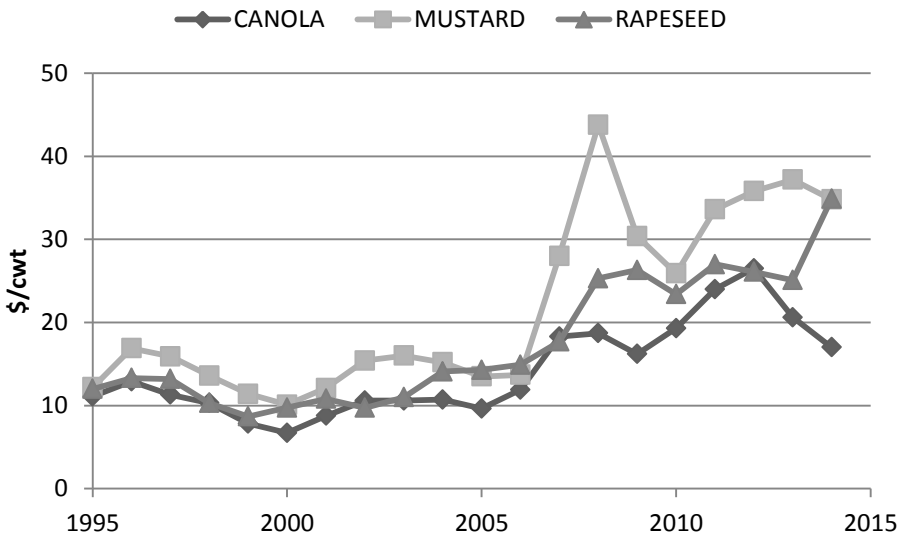


Figure 5. U.S. Yields, Select Oilseeds, 1995-2014

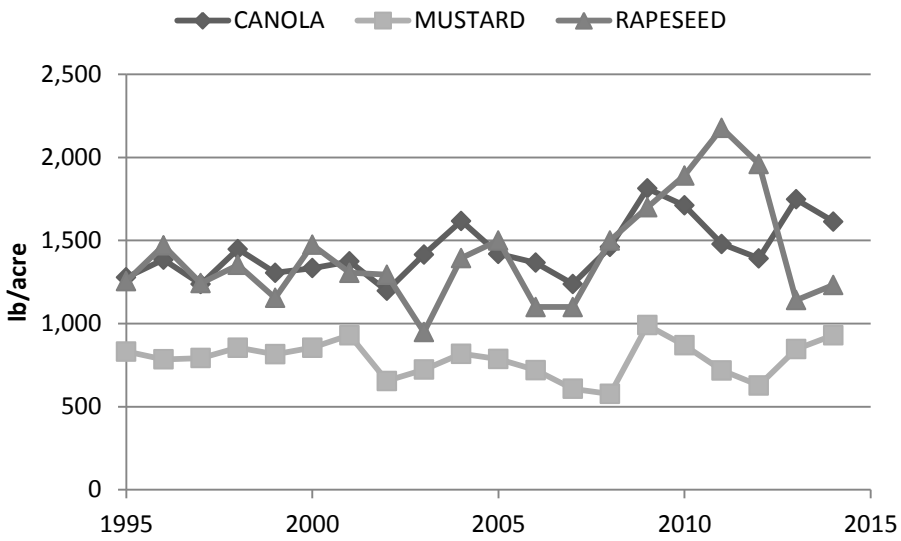
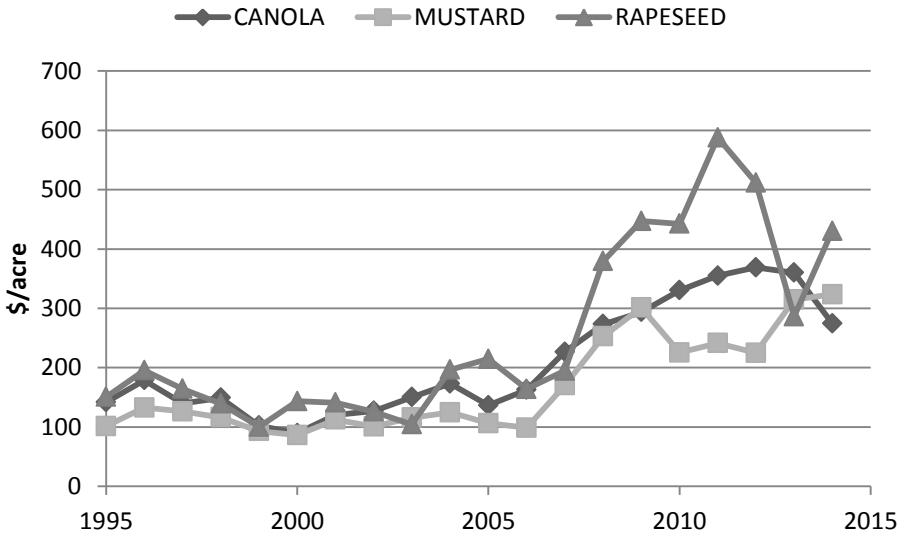


Figure 6. U.S. Crop Values, Select Oilseeds, 1995-2014



Conclusions

Obtaining insurance for new or emerging crops can be complicated, even when some form of insurance is available in other areas. Potential growers of camelina and carinata would already need

to look for coverage for 2016. Given the likely presence of a grower contract, they may choose to self-insure or obtain single-peril coverage (such as hail insurance). Growers of camelina in new areas do not have the ability to obtain written agreements. Thus, either petitioning to change the camelina plan or exploring NAP coverage are the likely alternatives. Growers of carinata may consider exploring written agreements using the canola policy.

Regardless of any coverage obtained in 2016, growers will want to build their own yield histories and make yield data widely available. Such steps will facilitate the development of sound county-level yield information for eventual use in establishing T-Yields and rating or pricing policies. Growers will need to work with their insurance agents, the relevant RMA regional office and perhaps their Farm Service Agency office until a plan meets their needs. While NAP coverage is fairly comprehensive, COMBO policies tend to have greater coverage level choices, provisions for prevented planting, revenue coverage and extensive quality provisions.

References

AgriLogic Consulting, LLC. Feasibility Study for Insuring Dedicated Energy Crops. May 9, 2011.

Agrisoma Biosciences, Inc. *Resonance Carinata 2015 Production Manual: A Guide to Best Management Practices US Northern Plains*. Saskatoon, SK, 2015.

Coble, K.H., T.O. Knight, B.K. Goodwin, M.F. Miller and R.M. Rejesus. *A Comprehensive Review of the RMA APH and COMBO Rating Methodology*. Final Report to the Risk Management Agency, USDA, March 15, 2010.

Edwards, W. *Proven Yields and Insurance Units for Crop Insurance*. FM 1860, Iowa State University, September 2014.

Farm Service Agency. *The Noninsured Crop Disaster Assistance Program for 2015 and Subsequent Years*. 2014 Farm Bill Fact Sheet, USDA, December 2014.

Flaskerud, G., W. Wilson and B. Dahl. "Managing Canola Price Risk." Journal of the ASFMRA (2002): 53-63.

Foulke, T., M.E. Geiger, and B. Hess. "An Analysis of On-Farm Feed and Fuel from Dryland Camelina." *Journal of the ASFMRA* (2012): 43-56.

Fuglie, K.O., P.W. Heisey, J.L. King, C.E. Pray, K. Day-Rubenstein, D. Schimmelpfennig, S. Ling Wang, and R. Karmarkar-Deshmukh. *Research Investments and Market Structure in the Food Processing, Agricultural Input, and Biofuel Industries Worldwide*. ERR-130. U.S. Dept. of Agriculture, Econ. Res. Serv. December 2011.

Grady, K. and T. Nleya. *Camelina Production*. Extension Extra, SDSU, Brookings, May 2010.

Grazingland Management Systems, Inc. *Development of Additional Crop Programs under Rainfall or Vegetation Index: Suitability for Coverage for Camelina*, Feasibility Report, March 20, 2009.

Keske, C.M.H., D.L. Hoag, A. Brandess, and J.J. Johnson. "Is it economically feasible for farmers to grow their own fuel? A study of Camelina sativa produced in the western United States as an on-farm biofuel." *Biomass and Bioenergy* 54 (2013): 89-99.

McPhail, L., P. Westcott, and H. Lutman. *The Renewable Identification Number System and U.S. Biofuel Mandates*. BIO-03, Economic Research Service, USDA, November 2011.

RMA. *Canola and Rapeseed: Montana and North Dakota*. A Risk Management Agency Fact Sheet, Billings Regional Office, USDA, Revised April 2015.

RMA. *Mustard: Montana and North Dakota*. A Risk Management Agency Fact Sheet, Billings Regional Office, USDA, Revised March 2015.

RMA. *Camelina: Montana and North Dakota*. A Risk Management Agency Fact Sheet, Billings Regional Office, USDA, Revised February 2015.

RMA. *Requesting Insurance Not Available in Your County*. A Risk Management Agency Fact Sheet, USDA, Revised August 2014.

SCIC. *Guide to Understanding Crop Insurance*. Accessed June, 2015 at: http://www.saskcropinsurance.com/files/ci/pubs/Multi-Peril_Web.pdf

Shields, D.A. *Federal Crop Insurance: Background*. Congressional Research Service, CRS Report, 7-5700, December 12, 2013.

Vakulabharanam, V. "Carinata production in Saskatchewan." *Agriview*, Saskatchewan Agriculture, Volume 8, Issue 08, December 2012 – January 2013, p. 5.

Wilson, W.W. and B. Dahl. "Contracting for Canola in the Great Plains States." *Canadian Journal of Agricultural Economics* 62(2014): 89-106.