Division of Marketing
Agricultural Development and Diversification (ADD) Program

1991 Grant Final Report

Grant Number 06001

Grant Title Study & Develop the Feasibility of Growing Dry Beans & Developing Their Marketing As Well As the Marketing of Other Agricultural Products

Amount Awarded $20,000.00

Name Norval Dvorak

Organization Dvorak Farms Bean and Ag. Products Ltd.

Manitowoc

E-Mail

WEB

Department Contact: DATCP - Marketing - ADD Grants
PO Box 8911 Madison, WI 53708-8911
Tel: (608)224-5136
http://datcp.state.wi.us

INDEX TO GRANT APPLICATION W.D.A.T.C.P. CONTRACT NO. 6001

RE: RAISING AND MARKETING PINTO BEANS

I. **GRANT APPLICATION**

II. **EDIBLE BEAN PRODUCTION - FIELD GRADING REPORTS**

III. **SUMMARIZATION OF THE PROJECT**
- A. PRODUCTION
- B. CULTURAL POLICIES
- C. BEAN CLEANING AND PREPARATION FOR GRADING
- D. MARKETING

IV. **EVALUATION AND RECOMMENDATIONS**

V. **DRY EDIBLE BEAN EXPENSE ACCOUNT SCHEDULE**
- A. EXPENSES
- B. SUMMARY OF INCOME AND EXPENSES AND RELATIONSHIPS TO GRANT MONIES RECEIVED.

VI. **SUPPLEMENTARY INFORMATION**
- A. FIELD CROPS MANUAL ON FIELD BEAN PRODUCTION.
- B. HERBICIDES PERMITTED IN WEED CONTROL ON EDIBLE DRY BEANS.
- C. F.S. - MIDLAKES AGREEMENT
- D. COPY OF AGREEMENT WITH PRODUCERS.
- E. COPIES OF EVALUATION REPORTS RECEIVED FROM PRODUCERS INVOLVED IN THE PROJECT.
- F. COPY OF SAMPLE INSPECTION CERTIFICATE

REQUEST FOR PROPOSAL

AGRICULTURAL DEVELOPMENT AND DIVERSIFICATION

COVER SHEET

Study and develop the feasibility of growing dry beans and developing their marketing as well as the marketing of other agricultural products. This project is especially targeted to the emerging, expanding Mexican market and should help diversify and further develop Wisconsin agriculture.

Applicant: Dvorak Farms Bean and Agricultural Products Ltd.

by: Norval Dvorak - President

Stephen Dvorak - Secretary-Treasurer

Address: Dvorak, N. - 6027 Fisherville Rd., Whitelaw, WI 54247

Telephone - 414-682-2654

Fax - 414-755-4196

Dvorak, S. - Chilton, WI 53014

Telephone - 414-849-9304

Fax - 414-849-4315

Amount of funding requested: $20,000

Duration of project: February 1, 1991 - December 31, 1991

IDENTIFICATION OF NEED

The country of Mexico's inhabitants consume over 1,200,000 M.T. of pinto beans per year. It is the major dietary staple. Competing countries for the imported fraction totaling some 600,000 M.T. are China, Canada, U.S.A. and others. Their growing population continues to provide an expanding market for pinto, black, and other beans. Wisconsin can compete with U.S. States such as Michigan, Minnesota, North and South Dakota and California who already are producers of pinto beans. We are a major bean growing state. The growing, contracting, storage and transportation network in Wisconsin has never been developed. This is a most opportune time as milk price supports are low and farmers are looking for alternative crops, to give serious consideration to introducing to this state a crop that would add 80 million dollars of additional crop income to Wisconsin farmers.

This grant application speaks to developing the infra structure for such a production and marketing system.

This grant application also addresses the organization and development of a trading company that would engage in not only marketing of dry beans in Mexico but also take advantage of that market area for Wisconsin beef product, pork product, corn, grain, soft red winter wheat and dry milk supplies.

PROJECT SUMMARY

This project of developing a dry bean growing enterprise primarily targeted for the export trade represents the largest alternative crop enterprise offered in the state of Wisconsin. The annual volume represents a direct introduction of approximately 80 million dollars of alternative income to our agriculture.

This entails a cash infusion into the State that is not dependent on U.S. government subsidies or Chicago Board of Trade commodity market price variances and speculatives. This venture stability is attributable to the necessity of supplying one of the two basic foodstuffs to the residents of Mexico. it is especially appropriate at a time when President Bush and President Carlos Salinas are negotiating the opening of doors to a free trade agreement between the two nations.

This projects ultimate purpose and the grant request is aimed at developing the business infra structure to make this dry bean production and marketing enterprise a viable and profitable one.

STATEMENT OF OBJECTIVES

The objective of this proposed activity and grant request is to develop the Wisconsin infra structure needed to successfully engage in the production, contracting, growing, harvesting, storing, shipping, marketing, financing and accounting for a potential annual 200,000 M.T. "pinto, black, and other bean" market in Mexico. Approximately 250 acres of dry beans shall be grown in Wisconsin in the 1991 crop season. It is hoped that this shall represent the prototype for a greatly expanded acreage in future years. Simultaneously diligent efforts will be made to develop the long term contracts with Mexican importers and distributors. Other agricultural products produced in Wisconsin such as non fat dry milk powder, grains, and boxed beef products will also be part of the marketing plan.

EXPECTED RESULTS AND APPLICABILITY TO DEVELOPMENT

Pinto beans have been grown for years in North and South Dakota, Minnesota, Michigan and other states for a primary Mexican and South American market where beans are a primary protein dietary staple. The exploding population in these areas and the need of these governments to feed their peoples a nutritional diet and with a minimum budgetary cost places the domestic needs of Mexico alone at 1.2 million tons per year of edible beans.

Wisconsin farmers are looking for viable, profitable, cropping income alternatives to reduce their dependence on the production of corn and soybeans. Beans, as a legume crop, if the contract price is favorable, represent an acceptable alternative in a crop rotation. Pinto beans average about 1600 pounds of production per acre and can be expected to yield similarly to soybeans. The 200,000 M.T. goal divided by the 1600 pound per acre production indicates a need for about 270,000 contracted acres. Assuming a market price of 18 cents per pound to the producer this represents a total production value estimate of $288,000 per acre. 200,000 M.T. at 2200 pound per ton = 440,000,000 pounds x 18 cents = an 80 million dollar potential business.

Added to this must be the added returns to agricultural infra structure beneficiaries such as grain storage, elevators, trailers, railroads, barges, et all. The 80 million dollars with a 3X multiplier effect on fuel, machinery, equipment and other intra structural supplies equates to over a 240 million dollar effect.

With a free trade arrangement being negotiated with Mexico, the potential for agricultural sales of corn, soybeans, wheat, beef and pork products makes this market one of the most attractive in this hemisphere.

PLAN OF WORK

1. *Establish the parameters of the marketing agreement with the government of Mexico. This includes verifying proper signatures, delivery conditions and dates, possible penalties for failure to perform, methods of payment, terms, conditions, letters of credit.*

2. *Secure working lines of credit so that producers, seed suppliers, warehouses, transport agencies and all can be reimbursed on a timely basis. This may among others require developing a lead bank with an enlistment of Commodity Credit Corporation and the Export Import Bank assistance.*

3. *Develop a network of support. This will include Wisconsin Department of Agriculture personnel, ASCS, University Agronomists and farm management personnel, major seed companies, farm organization leaders, transportation people and those who would have an interest in the new ventures success as a continuous contributor to Wisconsin diversified agriculture.*

4. *Develop with the assistance of above a plan of logistics including: the drawing up of contracts that are capable of achieving the desired ends, production budgets that can be advertised among the agricultural community; production meetings to acquaint producers with the cultural practices involved in planting, cultivating, weed control, fertilization, harvesting, storage and delivery requirements related to the crops' production and marketing.*

5. *Develop a personnel, equipment and office budget that will be needed to administer, manage and supervise the execution of the project from contracting through harvesting and marketing, screen and employ same with proper job descriptions and areas of responsibilities.*

6. *Establish the options of alternative sources of supply so that the market demand can be supplied and performance credibility assured.*

KEY PERSONNEL

Norval Dvorak:	*Consultant to the food industry, has extensive experiences in contracting of production, agri business, and business growth and development.*
Stephen Dvorak:	*Owner/operator D & D Equipment Co., Chilton, Wisconsin.* *Owner/operator P.E. Empro Corp., Chilton, WI. An "environmental clean up" waste management company.*
Jim Murray:	*Professor University of Wisconsin Green Bay. Economist and consultant to the project.*

FACILITIES AND EQUIPMENT

Facilities for seed storage, for bean storage, bagging, transportation, et all. will be on a lease basis and compensation controlled and paid for on the basis of services performed.

Marketing of dry beans, grains, milk products, beef and pork products embodies a trading company concept, as such office furniture, telephone, fax machines, computers are the primary capital investments needed in this operation

August 20, 1991

To: Bud Sholts

From: Ed Bergman

Subject: Herbicides Registered Nationally for Use on Dry Edible Beans, including Pinto Beans

1. I reviewed the list of herbicide products that you obtained from Michigan. Of the herbicides listed under dry edible beans (crop group) only Lasso cannot be used in Wisconsin. Lasso apparently has a Special Local Needs (24c) registration for Michigan and states west of the Mississippi River. The following herbicides from the list can be used on pinto beans in Wisconsin: metolachlor (Dual), chloramben (Amiben), EPTC (Eptam), pendimethalin (Prowl), ethalfluralin (Sonalan) Trifluralin (Treflan), bentazon (Basagran) and sethoxydim (Poast).

2. I am also enclosing a list of pesticide products from the Crop Protection Chemical Reference that **may** be registered for use on dry edible beans including pinto beans. Individual growers need to check product labels to determine if a particular product is specifically registered for dry beans or pinto beans. Some products may be registered for use only in certain states under special supplemental (SLN) labeling.

3. I am sure that there is a person at UW Extension who is somewhat familar with pinto beans. In the past I have corresponded with Dr. R. Gordon Harvey, UW Department of Agronomy (262-7975) on issues related to use of herbicides on dry beans.

cc: Jim Smith
Nick Neher

EDIBLE BEAN PRODUCTION

Producer Lot No.	No.Lbs.	Bags	No.Acres	Amount Received	Received Per Acre
1	22,650	453	22	$3,624.	$ 165.00
2	35,000	700	21	3,500.	170.00
3	32,100	642	20	5,136.	256.80
4	34,950	699	21	5,592.	266.00
5	28,150	563	20	2,815.	140.00
6	32,500	650	50	3,250.	65.00
7	-0-	-0-		-0-	-0-
8	6,950	139	20	695.	30.50
	192,300#	3,846 bags		$24,612.	

No. 1 Beans - Producer received $.16/lb.
No. 2 Beans - Producer received $.16/lb.
Substandard Beans - Producer received $.10/lb.

FIELD GRADING REPORT

Lot #	Grade	% Split	Damage	Foreign Material	Total Defects	Moisture	Odor
1	No. 2	1.9	1.7	0.0	3.6	17.2	OK
2	S.Std.	1.0	6.0	0.3	7.3	14.2	OK
3	No. 2	3.9	0.6	0.1	4.6	17.7	OK
4	No. 1	0.8	1.0	0.1	1.9	16.1	OK
5	S.Std.	7.4	1.2	0.6	9.2	14.0	OK
6	S.Std.	5.1	4.8	0.1	10.0	14.6	OK
7	-	-	-	-	-	-	-
8	S.Std.	8.5	2.0	0.6	11.1	13.3	OK

SUMMARIZATION:

Production

1. The beans were planted too late; primarily because request for the funding and receiving beans for planting didn't get the beans into the ground until about the 1st of June. An early May planting is far preferable.

2. Cultural practices were not well-defined:

a. No set format was established for planting in rows with a modified corn planter or a grain drill for solid seeding.

b. No weed control program had been approved and thus, most of the growers practiced little or no weed control programming. The lack of such a program wiped out two of the growers completely. Such a program is now documented in the appendix.

c. Harvesting in each case was done on a direct combining basis without precut, windrowing and drying in the windrows. As a result, there was a great difference in the bean moisture content with some coming in at excessively high levels. Drying procedures require very careful, controlled time/temperature. This was not available and this uniformity of moisture was not attainable. Although the direct combining leaves some things to be desired, it is my opinion that had the beans been precut and windrowed with

almost continuous rains in the harvest season, the crop would have probably been lost to sprouting in the windrows. The beans were harvested late because they were planted late, and so drawing conclusions is difficult.

3. Bean cleaning and preparation for grading. The pinto beans were cleaned, bagged and then sampled at the Mid-Lakes FS Cooperative at Newton, WI. The equipment represents a simple screening and sizing operation. Although it did a good job on the good quality beans, it lacked the sophistication to remove the damaged and split seeds in the quantities that were present in a number of the lots. If a commercial venture were to be developed, added investment would have to be made for cleaning equipment that has become standardized by companies such as Coop. Elevator, Michigan, or others.

4. Grading. In the exhibits, the variance in the grading of the separate lots is quite marked. One of the major contributors to this was the growing season itself. The plants started our well, began to flower, and hit a dry spell which interrupted growth. This was followed by a wet, humid, hot weather which stimulated new growth and flowering and a late maturing. Some of the late maturing seeds took on a damaged, shrunken appearance which adversely affected the quality grade. As a result, a large fraction of the beans graded substandard and could not be sold in conventional markets that require No. 1 or No. 2 beans.

Marketing

This project is a classic example of how much easier it is to forecast and project from unknown positions, than it is to realize one's projections. We had made solid efforts to develop markets before the first beans were planted and had gone to Mexico City to contract with a broker/distributor. We explained the program, discussed the levels of production and thus needed sales. But then I made a basic error. I got an oral commitment to take the beans at an agreed upon price, but not a written agreement. The outlet was known to me and that became a fatal error. During the growing season, several calls were made to this buyer. No problems!

The problem came at harvest time, when we were ready to make delivery. The response, "I'm sorry, but Mexico has had the biggest pinto bean harvest in history. The government will not give me any import permits, and so I cannot help you."

It's at that point that the marketing learning curve really began to develop. We turned to two Michigan bean companies who are in the business to market our beans for us at prices considerably below those first projected. Several producers wound up feeding the damaged beans, those with excessive moisture and splits, to cattle.

EVALUATIONS AND RECOMMENDATIONS:

1. A manual of the "do's and don't's" needs to be developed or procured on cultural practices one needs to follow in growing dry edible beans.
2. Some private or cooperative grain company that has cleaning equipment and storage facilities needs to become involved and interested in initiating a program on edible beans.
3. In spite of all of the difficulties, some of the bean growers would still like to grow beans, and looked upon this project for what it was -- a learning experience.
4. Whoever undertakes this project should spend added time and money on establishing markets. Prices on pinto and edible beans vary a great deal. They can vary on No. 1's and 2's from $.11/lb. to $.22/lb. This market price establishment is critical if edible beans are to compete with soybeans or corn for which commodities markets are well-established.
5. I would suggest that the State of Wisconsin, under this same grant program of Agricultural Development and Diversification, seek out another party, perhaps in Southern or Central Wisconsin, and invest another $20,000. to further test the economic feasibilities of this crop.

Buckle (Monsanto) (H) p 1581
*Buctril (Rhone-Poulenc) (H) p 1774
Cerone (Rhone-Poulenc) (PGR) p 1795
Chiptox MCPA Sodium (Rhone-Poulenc) (H) p 1798
Curtail (DowElanco) (H) p 770
Curtail M (DowElanco) (H) p 773
*Cyclone (ICI) (H) p 1237
Cythion ULV (Cyanamid) (I) p 309
Cythion 57% EC (Cyanamid) (I) p 313
Dacamine 4D (Fermenta) (H) p 1118
DiPel ES East (Abbott) (I) p 251
DiPel 2X (Abbott) (I) p 255
DiPel 4L (Abbott) (I) p 257
*Di-Syston 15% G (Mobay) (I) p 1433
*Di-Syston 8 (Mobay) (I) p 1439
Esteron 99 (Rhone-Poulenc) (H) p 1802
Express (DuPont) (H) p 955
Fallow Master (Monsanto) (H) p 1594
Far-Go (Monsanto) (H) p 1596
Far-Go Granular (Monsanto) (H) p 1600
Finesse (DuPont) (H) p 970
Formula 40 (Rhone-Poulenc) (H) p 1814
*Furadan 4F (FMC) (I)(N) p 1163
*Furadan 4F (Mobay) (I) p 1449
Glean Fertilizer Compatible Herbicide (DuPont) (H) p 978
*Gramoxone Extra (ICI) (H) p 1329
*Gramoxone Super (ICI) (D)(H) p 1344
Harmony Extra (DuPont) (H) p 988
*Hoelon 3EC (Hoechst) (H) p 1186
Karmex DF (DuPont) (H) p 999
Landmaster BW (Monsanto) (H) p 1608
Landmaster II (Monsanto) (H) p 1611
Lannate (DuPont) (I) p 1010
*Lannate L (DuPont) (I) p 1015
*Lannate LV (DuPont) (I) p 1021
Lexone DF (DuPont) (H) p 1026
Manzate 200 DF (DuPont) (F) p 1049
Microthiol Special (Atochem) (F)(M) p 419
*Penncap-M (Atochem) (I) p 421
Ranger (Monsanto) (H) p 1672
Reldan 3% (Uniroyal Chemical) (I) p 2124
Rhomene (Rhone-Poulenc) (H) p 1840
Rhonox (Rhone-Poulenc) (H) p 1842
Roundup (Monsanto) (H) p 1674
Roundup RT (Monsanto) (H) p 1697
Sencor DF (Mobay) (H) p 1517
Sencor 4 (Mobay) (H) p 1544
Showdown (Monsanto) (H) p 1705
Stampede CM (Rohm and Haas) (H) p 1995
Stinger (DowElanco) (H) p 813
Sulv (Uniroyal Chemical) (H) p 2099
*Telone II (DowElanco) (SF) p 834
*Telone C-17 (DowElanco) (F)(N) p 838
Terra-Coat LT-2N (Uniroyal Chemical) (SP) p 2128
Thiodan 3 EC (FMC) (I) p 1175
Thiodan 50 WP (FMC) (I) p 1178
Thiolux DF (Sandoz) (F)(M) p 2042
Tilt (Ciba-Geigy) (F) p 744
Treflan TR-10 (DowElanco) (H) p 881
Treflan E.C. (DowElanco) (H) p 845
Treflan M.T.F. (DowElanco) (H) p 858
Treflan 5 (DowElanco) (H) p 869
Vapam (ICI) (SF) p 1413
Vitavax 200 FL (Uniroyal Chemical) (F)(SP) p 2116
Vitavax PCNB (Uniroyal Chemical) (F) p 2131
Vitavax Pour On (Uniroyal Chemical) (F) p 2117
*Vorlex (NOR-AM) (SF) p 1735
Weedar 64 (Rhone-Poulenc) (H) p 1916
Weedone LV4 (Rhone-Poulenc) (H) p 1920
Weedone LV6 (Rhone-Poulenc) (H) p 1925
Weedone 638 (Rhone-Poulenc) (H) p 1932

Beans (all dry)
Amiben Granular (Rhone-Poulenc) (H) p 1756
Amiben DS (Rhone-Poulenc) (H) p 1739
Apron 25W (Ciba-Geigy) (F)(SP) p 610
Apron-Terraclor (Uniroyal Chemical) (F) p 2120
*Asana XL (DuPont) (I) p 894
Basagran (BASF) (H) p 455
Benlate 50 DF (DuPont) (F) p 911
Biobit FC (DuPont) (I) p 916
Biobit WP (DuPont) (I) p 917
Bravo 500 (Fermenta) (F) p 1096
Bravo 720 (Fermenta) (F) p 1104
Bravo 90DG (Fermenta) (F) p 1110
*Cannon (Monsanto) (H) p 1588
Comite (Uniroyal Chemical) (M) p 2064
Cygon 400 (Cyanamid) (I)(M) p 304
Cythion ULV (Cyanamid) (I) p 309
Cythion 57% EC (Cyanamid) (I) p 313
Dacthal W-75 (Fermenta) (H) p 1129
Dibrom 8 Emulsive (Valent) (I) p 2147
DiPel ES East (Abbott) (I) p.251
DiPel ES (Abbott) (I) p 253
DiPel 2X (Abbott) (I) p 255
DiPel 4L (Abbott) (I) p 257
*Di-Syston 15% G (Mobay) (I) p 1433
*Di-Syston 8 (Mobay) (I) p 1439
Dual (Ciba-Geigy) (H) p 659
*Dyfonate 4-EC (ICI) (I) p 1273
Dyfonate II 10-G (ICI) (I) p 1277
Javelin WG (Sandoz) (I) p 2020
Kelthane MF (Rohm and Haas) (M) p 1975
Lannate (DuPont) (I) p 1010
*Lannate L (DuPont) (I) p 1015
*Lannate LV (DuPont) (I) p 1021
*Lasso (Monsanto) (H) p 1619
*Lasso-Micro-Tech (Monsanto) (H) p 1644
Orthene 75S Soluble Powder (Valent) (I) p 2154
*Penncap-M (Atochem) (I) p 421
Poast (BASF) (H) p 503
Prowl (Cyanamid) (H) p 328
Ridomil 2E (Ciba-Geigy) (F) p 715
Ridomil PC 11G (Ciba-Geigy) (F) p 730
Roundup (Monsanto) (H) p 1674
Rovral (Rhone-Poulenc) (F) p 1844
Rovral 4F (Rhone-Poulenc) (F) p 1850
Sequestrene 138 Fe (Ciba-Geigy) (O) p 738
Sequestrene 330 Fe (Ciba-Geigy) (O) p 739
Sevin XLR Plus (Rhone-Poulenc) (I) p 1856
Sevin 80S (Rhone-Poulenc) (I) p 1868
Sevin 50W (Rhone-Poulenc) (I) p 1881
Sevin 4F (Rhone-Poulenc) (I) p 1870
Sonalan 10G (DowElanco) (H) p 800
Sonalan E.C. (DowElanco) (H) p 802
Sulfur Signal (ICI) (F)(I) p 1379
Sulfur Special Electric (ICI) (F)(I) p 1386
*Telone II (DowElanco) (SF) p 834
*Telone C-17 (DowElanco) (F)(N) p 83
*Temik 15G (Rhone-Poulenc) (I)(M)(N p 1905
Temik 15G for CA Only (Rhone-Poul (I)(M)(N) p 1901
Terraclor (Uniroyal Chemical) (F) p 2
Terraclor 10% Granular (Uniroyal Ch (F) p 2103
Terraclor 75% WP (Uniroyal Chemica p 2105
*Thimet 15-G (Cyanamid) (I) p 379
*Thimet 20-G (Cyanamid) (I) p 383
Thiodan 3 EC (FMC) (I) p 1175
Thiodan 50 WP (FMC) (I) p 1178
Topsin M 70W (Atochem) (F) p 433
Topsin M 4.5F (Atochem) (F) p 440
Topsin M 85WDG (Atochem) (F) p 4
Treflan TR-10 (DowElanco) (H) p 88
Treflan E.C. (DowElanco) (H) p 845
Treflan M.T.F. (DowElanco) (H) p 8
Treflan 5 (DowElanco) (H) p 869
TRI-4 (Cyanamid) (H) p 387
Vapam (ICI) (SF) p 1413
Vitavax Pour On (Uniroyal Chemical p 2117
*Vorlex (NOR-AM) (SF) p 1735

Beans (castor)
(see under Castor Beans)

Beans (green or snap)
Amiben DS (Rhone-Poulenc) (H) p
Apron 25W (Ciba-Geigy) (F)(SP) p
Apron-Terraclor (Uniroyal Chemica p 2120
*Asana XL (DuPont) (I) p 894
Basagran (BASF) (H) p 455
Benlate 50 DF (DuPont) (F) p 911
Biobit FC (DuPont) (I) p 916
Biobit WP (DuPont) (I) p 917
Botran 75WDG (NOR-AM) (F) p 1
Bravo 500 (Fermenta) (F) p 1096
Bravo W-75 (Fermenta) (F) p 1102
Bravo 720 (Fermenta) (F) p 1104
Bravo 90DG (Fermenta) (F) p 111
Comite (Uniroyal Chemical) (M) p
Cygon 400 (Cyanamid) (I)(M) p 30
Cythion ULV (Cyanamid) (I) p 30
Cythion 57% EC (Cyanamid) (I) p
*D•z•n diazinon 14G (Ciba-Geigy)
*D•z•n diazinon 50W (Ciba-Geigy)
*D•z•n diazinon AG500 (Ciba-Geig
Dacthal W-75 (Fermenta) (H) p 11
Dibrom 8 Emulsive (Valent) (I) p
DiPel 2X (Abbott) (I) p 255
DiPel 4L (Abbott) (I) p 257
*Di-Syston 15% G (Mobay) (I) p 1
*Di-Syston 8 (Mobay) (I) p 1439
Dual (Ciba-Geigy) (H) p 659
*Dyfonate 4-EC (ICI) (I) p 1273
Dyfonate II 10-G (ICI) (I) p 1277
Eptam 7-E (ICI) (H) p 1290
Eptam 10-G (ICI) (H) p 1285
*Gramoxone Extra (ICI) (H) p 13
*Gramoxone Super (ICI) (D)(H) p
Kelthane MF (Rohm and Haas)
Lannate (DuPont) (I) p 1010

TELEPHONE 414-682-0134

MID-LAKES FS COOPERATIVE

FRANCIS CREEK, WISCONSIN 54214

BRANCHES AT
FRANCIS CREEK
NEWTON
HILBERT
SHIRLEY

EXPERIMENTAL PINTO BEAN PROJECT

ENTERED INTO WITH MID-LAKES FS AND NORVAL DVORAK

Mid-Lakes FS agrees to take into storage, clean and bag, and warehouse Pinto Beans at our Newton Plant. It is understood that this is the amount of approximately 750,000 lbs. or the yield of 260 acres to be fanned and bagged for shipment.

Mid-Lakes FS agrees to maintain the facility in a clean state and to work with Mr. Dvorak to arrive at agreed upon quality standards for the operation. Quality will be the responsibility of Mr. Dvorak. Mid-Lakes FS will provide all the labor to clean and bag and handle the beans to load out at the Newton facility either by rail or truck. We will not be responsible for shrinkage or bean damage.

Mid-Lakes FS agrees to perform these services at the rate of $2.00 per hundred weight based on the incoming weight. Mr. Dvorak agrees to provide a means of disposing or removal of the cleanings from the fanning process. It is agreed that the labor to load out the bagged beans will be billed out at the rate of $10.00/Man Hour. All work in the facility will be performed by employees of Mid-Lakes FS.

In consideration of the need to have our facility ready to store farmer corn in the Newton area we further stipulate that all beans be delivered before October 31st. We need one week from delivery of beans before we will be expected to be ready for shipment in bags.

TELEPHONE 414-682-0134

MID-LAKES FS COOPERATIVE

FRANCIS CREEK, WISCONSIN 54214

BRANCHES AT
FRANCIS CREEK
NEWTON
HILBERT
SHIRLEY

(2)

A storage charge of 10¢ per hundred weight per week will be in effect after November 1, 1991 on all bulk beans being held at Newton. A storage charge of 5¢ per hundred weight per week will be in effect after November 1, 1991 on all bagged beans. All beans are to be removed by November 14,1991.

All billing will be direct to Norval Dvorak. All payments are due by November 30, 1991 and are 100% the responsibility of Norval Dvorak.

Agreed to this date 9-19-91

Norval Dvorak

Brock Bentson
Territory Manager

cc Ron Smith

EDIBLE BEAN GROWER'S CONTRACT

1991

AGREEMENT, by and between D & D Equipment Co., Inc., of Box 31, Hwy 151 W, Chilton, Wisconsin, hereinafter called the Company and _____ of _____, hereinafter called the Grower, as follows:

1. Basic Agreement. The Grower agrees to plant, grow, harvest and make available for delivery, a crop of edible beans during the year 1991, and the Company agrees to compensate the Grower for said delivered crop, all in accordance with the terms of this contract and specifications set forth herein. All edible beans must be planted before June 1st, or the company must be notified on intentions to plant late. The Grower agrees to plant only specified seed recommended by D & D Equipment Co. If any seed is planted by Grower other than Company recommended seed, this contract will be considered void.

2. Maintaining Crop. Grower shall furnish the land, machinery, equipment, labor, seed and herbicides necessary for preparing the seed bed, planting, growing, and weeding said crop, in good agronomic practice. Grower shall use herbicides, insecticides and cultivation, where necessary, to control weeds and insects.

3. Harvesting and Delivery. Grower shall be responsible for all costs of producing, harvesting and delivery of the edible beans to the Company, at an elevator centrally located in NE Wisconsin as determined by D & D Equipment.

When harvesting, Grower shall be responsible for all combine adjustments and operation. The combine cylinder and beater speed must be as slow as possible, generally 300 to 450 R.P.M., since excessive cylinder speed causes splitting and breakage of the beans.

4. Seed. THE COMPANY MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE SEED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OR MERCHANTABILITY OR FITNESS: IN NO EVENT SHALL THE COMPANY BE LIABLE FOR CONSEQUENTIAL DAMAGE.

5. Risk of Loss. Risk of loss for damage or destruction of the edible beans shall pass from the Grower to the Company upon delivery of the seeds to the Company at the designated elevator and acceptance by the Company.

6. Price and Payment. In consideration for the foregoing services furnished by the Grower, the Company agrees to pay the Grower for edible beans in proper condition grown, delivered to, and accepted by the Company

the sum of 16.0 cents per pound for any acreage. This will be subject to specification standards and deductions set forth herein.

7. Standards and specifications.

A. Minimum Requirements: All beans shall meet the following minimum standards and specifications. (The Company reserves the right, at its option, to reject and return to the Grower any beans that fails to meet these specifications and standards):

(1) All seed shall have less than 5% by weight foreign material and damaged bean combined. Foreign material is all matter other than edible beans. Damaged beans shall consist of broken, cracked, skinned, or hulled beans, beans affected by insects, heat, or frost or any other factor which may affect the desirability of the edible beans. Damaged beans and foreign material percentages shall be determined by screen samples at the Company's collection elevator as determined by the elevator company.

(2) Test weight shall be 55 pounds per bushel or higher.

(3) The seed shall be free of all corn and other grains.

(4) Moisture at combining shall be 19-22%.

B. Deductions.

(1) There shall be a dockage deduction of 1 percent for each percentage point of any foreign material and damaged beans combined by weight. There shall be an added dockage deduction of 1% per percentage point if product is brought in with over 7% foreign material. Anything over 12% will not be accepted.

(2) Beans should be combined at 19-22% moisture and low heat dried to 16% prior to elevator delivery. If low heat drying is not available to the Grower, the collection elevator will provide low heat drying and the cost of drying will be borne by the Grower.

8. No Assignment. This contract shall not be assigned by Grower without the written consent of the Company and the same shall be binding upon the Grower's heirs, successors and assigns.

9. Right of Entry. Company and Wis. Ag. Dept. Personnel shall have the right of access to fields at any time. The Grower shall have the right of access to Company's collection point to observe weighing, grading, and testing of beans.

10. Independent Contractor. The Grower is not an agent or servant of the Company and shall be held as an independent contractor, and the Company shall have no control over him in the performance of this contract other than as to the results to be accomplished. The Grower may employ such labors as he desires to carry out this contract, but such labors shall be the servants or agents of the Grower and not the servants or agents of the Company.

11. Non-Liability. Neither party shall be responsible for the non-performance of any part of this contract caused by Acts of God, weather, fire, strikes, accidents to machinery, inability of procure essential supplies from the usual sources, or any other causes reasonably beyond the control of the affected party. In such event, the Grower's compensation hereunder as to the crop or part thereof not delivered or rejected by the Company because so hindered or prevented shall consist only of his right to either plow under the crop or use it for the feeding of livestock (there will be no advance payment).

12. Lien on Crop. Grower shall keep the edible bean crop free and clear of all liens, encumbrances and interests of other parties and warrants and covenants his sole ownership of the beans, from date of planting to delivery to Company.

13. Payment Schedule. All beans will be paid for by the Company to the Grower within 30 days of time of delivery.

14. Remedies. In the event of a breach by the Grower of any material provision of this agreement, particularly as to the delivery of said beans other than to the Company, the Company shall, upon proper action instituted by it, be entitled to an injunction to prevent further breach and decree for specific performance hereof, according to the terms of this agreement.

Additionally, in the event of the violation by the Grower of any material provisions of this agreement, the contract shall be voidable, at the option of the Company.

The provisions of this contract do not limit or deny the Company additional remedies at law not specifically provided for herein, as such remedies are reserved by the Company.

Dated this _____ day of _____, 1991

D & D Equipment Co., Inc.

By: _____
Officer

_____
Grower

INFORMATIONAL - SUMMARY SHEET ON PINTO BEAN PROJECT

Grower Number 1

Date Beans Planted 5-24-91 Soil Type LMA + THB2

Rate of Planting 50 LBS PER ACRE Acres Planted 22

Equipment Used: X Corn Planter; or ____ Grain Drill

Did you Cultivate Beans? YES If yes, how often? 1

Did you Spray Beans? ____ If yes, with what? EPTAN 2½ PT, TRUST 1 PT PER ACRE

Comments on Weather Conditions, Growing Conditions, General Condition during Growing Season: LACK OF RAIN DURING THE PODDING PERIOD

Number Acres Harvested 22 Total Pounds Sold 22,650

Pounds Sold Per Acre 1030

Total Returns 3624.00

Returns Per Acre 165.00

Approximate Harvest Date SEPT 15-1991

Method of Harvest: X Straight Combining;

____ PreCut Followed by Combining

Harvesting Problems Encountered: NONE

General Observations: I DID HAVE A RAGWEED PROBLEM

Would You Ever Plant Pinto Beans Again? YES

INFORMATIONAL - SUMMARY SHEET ON PINTO BEAN PROJECT

Grower Number No. 3

Date Beans Planted _____ Soil Type clay loam

Rate of Planting 20 lbs per acre Acres Planted 20

Equipment Used: X Corn Planter; or _____ Grain Drill

Did you Cultivate Beans? yes If yes, how often? 2

Did you Spray Beans? yes If yes, with what? Basagran + oil

Comments on Weather Conditions, Growing Conditions, General Condition during Growing Season: I felt we had a very good year for Beans because it was a dry year

Number Acres Harvested 20 Total Pounds Sold _____

Pounds Sold Per Acre 32,100 lbs

Total Returns 5136.00

Returns Per Acre 256.80

Approximate Harvest Date _____

Method of Harvest: X Straight Combining;

_____ PreCut Followed by Combining

Harvesting Problems Encountered: Plant standibility was poor which made for a high field loss

General Observations: If we ever plant beans again I would plant, crush the field and spray with no cultivating. cultivating causes ridge's which in turn caused high field loses

Would You Ever Plant Pinto Beans Again? ?

INFORMATIONAL - SUMMARY SHEET ON PINTO BEAN PROJECT

Grower Number 4

Date Beans Planted 5-28-91 Soil Type Kewaunee

Rate of Planting 45 pounds. Acres Planted 21

Equipment Used: X Corn Planter; or ____ Grain Drill

Did you Cultivate Beans? yes If yes, how often? 1

Did you Spray Beans? yes If yes, with what? Dual + Prowl

Comments on Weather Conditions, Growing Conditions, General Condition during Growing Season: Got second blossoms which gave another set of pods which delayed harvest and not beet for following with winter wheat. Planting wheat too late. Could maybe plant earlier to avoid late harvesting.

Number Acres Harvested 21 Total Pounds Sold ____ please fill in from your record

Pounds Sold Per Acre ____

Total Returns ____

Returns Per Acre ____

Approximate Harvest Date 10-8-91

Method of Harvest: X Straight Combining;

____ PreCut Followed by Combining

Harvesting Problems Encountered: Cultivating left small ridges and with harvesting after frost plants had fallen into valleys making field lost too high.

General Observations: Cultivating produced second crop of weeds which chemicals did not control after frost the plants did not stand up anymore.

Would You Ever Plant Pinto Beans Again? ?

Thank you for filling this out.
Norval Dvorak

Repr

U.S. DEPARTMENT OF AGRICULTURE
FEDERAL GRAIN INSPECTION SERVICE

COPY
NOT NEGOTIABLE

COMMODITY INSPECTION CERTIFICATE

A- 45290

BEAN LOT INSPECTION

DATE OF ISSUANCE	ISSUED AT	LEVEL OF INSPECTION
NOVEMBER 4, 1991	MINNEAPOLIS, MN	ORIGINAL

APPLICANT	LOCATION OF COMMODITY
D & D EQUIPMENT HWY 151, CHILTON, WI 53014	MID LAKES FS COOP NEWTON, WI

IDENTIFICATION	QUANTITY AND CONTAINER
IDENTIFICATION: LOT 3 WAREHOUSE LOT COMMODITY: PINTO BEANS	QUANTITY: 32,100 LBS(VENDORS WEIGHT) 642- 50 LB KRAFT PAPER BAGS (VENDORS COUNT)

GRADE: U.S. NO 2 PINTO BEANS
FACTORS:

SPLITS	3.9%	FOREIGN MATERIAL	0.1%
DAMAGE	0.6%	TOTAL DEFECTS	4.6%
CONTRASTING CLASSES	0.0%	MOISTURE	17.7%
		ODOR	O.K.

REMARKS:
DVORAK FARM BEAN COMPANY
RT 1, FISHERVILLE ROAD
WHITELAW, WI 54247
END OF REPORT

Representative Inspection Certificate

I CERTIFY THAT THE SERVICES SPECIFIED ABOVE WERE PERFORMED WITH THE RESULTS STATED.

INSPECTOR

STEVEN M. BENNETT

This certificate is issued under the authority of the Agricultural Marketing Act of 1946, as amended (7 U. S. C. 1621 et. seq.), and the regulations thereunder (7 CFR 68.1 et. seq.), and is receivable in all courts of the United States as prima facie evidence of the truth of the statements therein contained. This certificate does not excuse failure to comply with the provisions of the Federal Food, Drug, and Cosmetic Act, or other Federal laws.
WARNING: Sec. 203(h) of the Agricultural Marketing Act of 1946 provides that anyone who shall knowingly falsely make, issue, alter, forge, or counterfeit any official certificate, or aid, assist, or be a party to such actions, is subject to a fine of not more than $1,000 or imprisonment for not more than 1 year, or both.
The conduct of all services and the licensing of inspection/grading/sampling personnel under the regulations governing such services shall be accomplished without discrimination as to race, color, religion, sex, or national origin.

MEMO

DATE: 2-24-92

TO: Bob Scholts - Wisc Dept Agr.

SUBJECT: Dry Edible Bean Project

FROM: Norval

Bob:

Thought you'd be interested in this article that showed in the Pro Farmer today on Dry Edible Beans "D.E.B" You may wish to attach it to my report. We could scarcely have picked a worse year to try to introduce D.E.B production to Wisc or anywhere.

I'm still trying to market some 100,000 lbs of substandards I've paid for and now I know why they are not selling.

Best Regards
Norval

$44 butcher bids may top hog markets this winter. Higher slaughter is worrisome. Still, the trade seems willing to eat right through the larger number. Above-forecast slaughter runs may signal that producers are shipping more sows and gilts due to poorer price outlook, rather than keeping them in the breeding herd.

Unbelievable feed conversions due to mild weather have sent butchers to town as much as 10 days early. So another fraction of the heavy runs may also reflect hogs pushed up the chute by one of the mildest winters on record in all of hog country.

Dairy prices are headed lower on a seasonal basis. January prices were 3% lower. Some price help may yet flow from buys of surplus dairy products shipped as a big part of aid programs to the CIS.

As we told you in our free *SuperStrategies* seminars, look for the Administration to announce price-enhancing moves during the flush period to avoid new dairy legislation.

Interest in disaster aid is heavy at ASCS offices as Farmers get in line for the $995 million disaster package to be divvied up. The government must calculate the factor by April 16 and have checks in farmers' hands by April 30, unless payment is delayed due to appeal. With the heavy disaster sign-up, you will only be getting a percentage of what you apply for.

The President has discretionary authority in an "emergency" to use another $755 million in disaster funds. Our guess is $100 million more, which is reserved for '92 crop winter wheat will be released pending more proof of winter wheat damage. We won't know if the rest will be used until closer to election time. A House Ag panel hearing to determine disaster fairness is coming March 3.

Take a break this summer with an exciting Canadian fishing trip! Come with *Pro Farmer* to beautiful Wollaston Lake Lodge in northern Saskatchewan. Catch lunker northerns and lake trout, feisty Arctic Grayling and scrumptious Walleye. For more information write:

Canadian Fishing, Pro Farmer, 219 Parkade, Cedar Falls, IA 50613.

Six ways to boost Russia's development efforts recommended by U.S. ambassador Robert Strauss:

Agriculture: Import U.S. experts in handling, packaging and storage of agricultural produce so the CIS doesn't waste so much.

Finances: Might be good to send former Fed chair Paul Volcker as a part-time consultant.

Food: Open 12 grocery stores which would specialize in basic foods, milk, eggs, sausage, vegetables. He has asked the mayor of Moscow for storefronts to start such a "corner grocery" program.

Investment: Strauss is bringing seven teams of investment bankers to a dozen Russian cities in March to stimulate American investment.

Oil: Proposes American oil companies consult on Siberian oil fields. Poor wells would be shut down, good ones upgraded. Strauss says this should be easy.

Transportation: Do what they did in Poland in 15 months — revamp the massive system. Station a Union Pacific railroad expert in Russia as an advisor for a year to reorganize.

Farmer-to-farmer program about to get underway thanks to a combination of government and private agencies. The goal is to place U.S. farmers in Czechoslovakia, Hungary, Malawi, Mexico, Namibia, Nicaragua, Panama, Poland and Zimbabwe for six weeks to provide expertise in crop production, livestock, forestry, environment and agri-business. The three-year volunteer program is expected to spread U.S. farm technical expertise from about 150 farmers, agri-businessmen and educators.

President Bush is seeking $20 million for this program specifically for the CIS. A few U.S. farmer/entrepreneurs are already sizing up the CIS to carve out a chunk of opportunity.

A dynamic new vision of managing your farm. That's the theme internationally-honored consultant Allan Savory offers March 5-7 at our Renewable Farming Conference at the Holiday Inn, Amana Colonies, Iowa.

Savory, founder and director of the Center for Holistic Resource Management, is best known globally for cattle and range management. But his management system applies to all your farming roles from business control to production that "truly sustains profit in agriculture," as Savory puts it.

The conference also features leading consultants Dave Larson, Don Schriefer and Dan Skow, plus seven other farmers and specialists on the cutting edge of Renewable Farming. It's our way of showing how good economics and good ecology can reinforce each other, instead of conflicting.

For information or registration ($145 for *Pro Farmer* members, $195 for non-members), phone 1-800-635-3936.

Edible bean bids have bottomed...

That's what Gary Kelley, President of the Kelley Bean Co., Morrill, Nebraska says regarding what has been a trying market for western producers.

Due to very abundant rain, a double crop from the Red River Valley (known as Min/Dak) killed the dry edible bean (DEB) market last fall. It sank to $10/cwt. and stayed there until recently. This week, prices for navies and great northerns are $12 to $13. Cost of production is around $16 in western Nebraska, but perhaps as low as $10.50 for Min/Dak producers.

Kelley believes growers retain 60% of last year's crop and don't intend to sell at these levels. Add to that clear indications that low edible bean prices and high wheat will reduce acreage from 15% to 50% depending on the area.

Loss of DEB export markets keep price forecasts modest even with less '92 acreage. Mexico is usually our largest DEB customer, but is subsidizing its own growers to the tune of $28 per cwt. to produce! Then because of ripoffs by the so-called "coyotes," the Mexican government stopped imports of U.S. DEBs this winter. The coyotes or renegade traders would import U.S. beans for $20 cwt or less and then deliver them to the Mexican government for the $28 support price and pocket the difference, according to Kelley. The government had to stop that by shutting off our exports. The impact of this is that Mexican production is way up and their edible bean imports slumber.

Iraq is lost as an export market for now. It was the number one customer of great northern beans. The Iraqis still owe the U.S. $2 billion for past food purchases and an embargo continues. Bleak outlook for that market.

Alternative
Field Crops Manual

Fieldbean

L. L. Hardman[1], E. S. Oplinger[2], E. E. Schulte[2], J. D. Doll[2], and G. L. Worf[2]

I. History:

The common or fieldbean (*Phaseolus vulgaris* L.) could have been domesticated independently in Central and South America. Fossilized seed material has been found in Central America and Peru which dates to 7,000 years ago. By the time European explorers arrived in the New World fieldbeans were an important food staple. Today fieldbeans (Pinto, Navy, Kidney) are the most widely cultivated species of *Phaseolus* and, in terms of tons of crop produced per year, they are the second most important legume in the world (soybeans are first). They are now widely grown in Mexico, Central America and the Caribbean, South America, Asia and to a lesser extent in Africa.

Fieldbean acreage in the United States is concentrated in Michigan, North Dakota, Minnesota, Idaho, Colorado, Nebraska with limited acreage in several other states including Wisconsin.

Grower interest in fieldbean in the United States is largely affected by market prices and proximity of buying stations or processing facilities. In the rest of the world fieldbeans are a major source of protein in the diet of subsistence farmers. The nine major pulse (grain legume) crops, in order of acreage world wide are: drybean (fieldbean, adzuki, mung), chickpea, fieldpea, cowpea, fababean, pigeon pea, vetch, lentil and lupine.

II. Uses:

Fieldbeans are specific types of *Phaseolus* which are harvested as mature dry seeds, as opposed to snapbeans which are harvested when pods are green and the seeds are succulent for use as a fresh vegetable. They require minimal processing between production field and consumer, so they must be intact and free of blemishes as well as pesticide residue when presented for sale. Excellent quality is equally important to yield in realizing maximum economic return.

Fieldbean seeds contain 22% protein, 2% fat, 61% carbohydrate (includes 5% fiber) as well as adequate levels of all vitamins and minerals.

There is an inverse relationship between per capita income level and consumption of legumes such as fieldbean. For example Brazilians consume about 70 grams of beans per day while United States consumers only use about 16 grams per day.

Fieldbeans are used in soups, chili dishes, baked bean and casserole recipes, refried bean paste, fresh salads and can be purchased in dried or previously canned and cooked products.

Beans which do not meet human food quality standards can be utilized for livestock. Large amounts of splits, culls and poor quality lots of fieldbeans are used in this manner. They must be incorporated into the ration based on actual nutrient content.

Bean seeds contain an inhibitor which prevents the trypsin enzyme from digesting protein in the digestive tract of non-ruminant animals. Heat treatment using a commercial roaster or extruder, or some type of cooking can denature this inhibitor.

The following table shows the nutrient composition of three market classes of fieldbeans compared to soybeans. Note that they are much lower in protein and fat, a fact which must be taken into account when substituting them for soybean meal in a diet or ration.

[1]Department of Agronomy and Plant Genetics, University of Minnesota, St. Paul,

Table 1: Nutrient composition of various classes of fieldbeans compared to soybeans.

Constituent	Pinto	Navy	Kidney	Soybean
	% composition[1]			
Crude protein	23.00	23.00	23.00	38.00
TDN	68.00	79.00	78.00	88.00
Fat	1.20	1.40	1.20	18.00
Calcium	0.13	0.15	---	0.25
Phosphorus	0.46	0.57	---	0.59
Fiber	4.10	4.20	4.10	5.00

[1]Values on air dry basis (83 to 90 % dry matter); F.B. Morrison, Feeds and Feeding, 22nd edition, the Morrison Publishing Company, Ithaca, N.Y., 1957.

III. Growth Habit:

Fieldbeans are warm season annual legumes with upright or bush as well as vine type or indeterminate growth habit. The first true leaf formed after the cotyledons emerge from the soil is simple or unifoliate and all subsequent leaves are compound (with three leaflets).

Small flowers (self-pollinated) are produced in clusters at various nodes on the plant and may be either white or lavender in color. Mature pod color, seed color and seed size or shape varies depending upon market class and/or variety.

The crop requires between 85 and 120 days from planting to maturity depending on variety. The first half of this period is vegetative development and the latter half is reproductive. In vine types there is an overlap of the two periods because continued vegetative growth occurs after flowering begins. Flowering continues for 2 to 3 weeks so there can be new pods, half developed pods and fully developed pods as well as newly opened flowers present on many plants in early August. Pods are initially green changing to light brown or tan as they mature. Each pod can contain 2 to 4 seeds depending upon variety.

The U.S.D.A. Marketing Service assigns beans to market classes, many of which can be grown in Minnesota and Wisconsin. A brief description of each market class is provided in the following paragraphs. For specific details on the varietal performance of beans within each class, see the most recent edition of Varietal Trials of Farm Crops, Miscellaneous Report 24, Agricultural Experiment Station, University of Minnesota or similar references from other universities or private companies.

Black Turtle: Plants of this class have short vines and produce dark black seeds with a white hilum.

Cranberry: Both bush and vine type varieties are available. Seed is similar to pinto except that the seed surface is pink with scattered reddish markings.

Great Northern: These plants have a viny, indeterminate growth and produce large flattened white seeds that compete with navys for dry package sales. Great northerns are not used for canned beans because the seeds soften and deteriorate during cooking.

Kidney: Plants of this class are upright, bush types that mature slightly later than navy or pinto. The seeds are large and flat with a distinct dark red coloration. Kidney seeds crack easily, and harvesting damage is a common cause of dockage or rejection at the buying station. Most kidney beans are canned and cooked as whole beans or as a component in canned chili products.

Navy: Both short vine and bush varieties are available, but Minnesota and Wisconsin growers utilize bush varieties to produce good quality white beans. Careful management is necessary to produce the blemish-free seeds which bring the highest price. Navys are used in canned pork and bean products or as bagged dry beans for boiling and baking purposes.

Pink: Plants of this class have indeterminate vines and are more susceptible to halo blight than pintos. Seeds of the pink class are medium sized and uniformly rosy redbrown at harvest. These beans are used interchangeably with small reds in canned bean products such as chili.

Pinto: These varieties generally have a prostrate vine type growth and produce a flattened buff-colored seed with scattered brown splashes on the surface. Pintos are used directly as baking beans or in a canned product. Refried bean paste is another use. Because of the mottled seed coat, weathering and disease spots do not reduce market quality as much as with white seeds.

Small Red: Small acreages of these short, vine type plants are grown in Minnesota. Seed of small red varieties are medium sized and uniformly red with a

white hilum. Market competitors for small reds are the pinto, cranberry, and pink classes. Production of good quality small red beans is difficult in humid climates because of rust and blight disease problems.

Small White: It is possible to produce these beans in Minnesota and Wisconsin. The seed resembles that of navy beans. The recommended variety has a short vine growth habit, and mature seed is difficult to tell from the slightly larger navy beans. Small whites and navy beans are used for the same commercial purposes.

IV. Environment Requirements:

A. Climate:

Fieldbeans are a warm season crop which performs best in temperatures ranging from 80°F highs to 50 to 60°F lows during the growing season. High temperature and moisture stress during the flower and pod setting period results in abortion of large numbers of blossoms and developing pods.

Growing season of 14 to 20 in. rainfall are best. Low relative humidity is best because bacterial and fungal disease problems are lessened. Light rainfall as crop nears maturity is best to facilitate maturity. Most types of fieldbeans require a frost free growing season of 85 to 120 days between mid-May and mid-September for best yield performance.

B. Soil:

Fieldbeans perform best on fertile sandy loam soils with good internal or tile drainage and moderate organic matter content. Soils that can be temporarily flooded, easily compacted, or which crust over regularly in early spring are not suitable for fieldbean production. These conditions result in plant death or restricted root system development.

Good water holding capacity in the upper 5 ft is essential, otherwise sprinkler irrigation will be required for best yield performance.

Soils with a pH between 5.8 to 6.5 are best. A soil pH above 7.2 can result in chlorosis problems due to iron and zinc deficiencies in certain varieties and/or market classes.

C. Seed Preparation and Germination:

Selecting high quality fieldbean seed for planting is essential. Germination percentage, physical appearance, varietal purity, and freedom from disease are the principal quality considerations. Bag labels usually provide information a grower needs about each seed lot; be sure to read these labels carefully. All states have a certification system to help ensure the availability of high quality seed and most use the following categories:

Breeder seed is controlled by the originator or owner of the variety and is used to produce foundation seed as the first step in the multiplication process.

Foundation seed is produced from breeder seed under the control of the designated seed certification agency in each state. White tags are used to identify bags of this seed.

Registered seed is produced from foundation seed and is carefully managed to maintain its genetic purity. Higher standards for field culture, seed cleaning, and storage are required of growers who produce registered seed. Purple tags are used to identify this seed.

Certified seed is produced from registered or foundation seed and, under certain conditions, from other certified seed. Good standards of field culture, cleaning, and storage are required of growers of certified seed. This class of seed is most commonly used by growers for commercial planting and is identified with blue tags. In Minnesota, fields being considered for certification require two field inspections as well as laboratory evaluations to ensure quality and purity.

States differ on standards and testing procedures for certification of edible beans. Because Idaho provides much of the seed, producers should understand three additional categories that are used in that state:

Seed labeled with a green tag indicates that a field inspection has been done by the Idaho Department of Agriculture (IDA) to check for blight symptoms. No varietal purity is guaranteed, nor are laboratory tests for seed-borne blight organisms conducted on such seed lots.

Seed labeled with a yellow tag by the IDA is intended for use only in Idaho. Yellow-tagged seed is reported to be blight-free based on a laboratory serological test. Yellow tags are issued for pinto, pink, great northern, small red, and lima beans. The Idaho Crop Improvement Association also issues yellow tags for seed lots in the certification system that fail to qualify for blue tags because of low germination or large numbers of split seeds.

Affidavit seed is not a part of the seed certification system, but this category is used by some companies for seed of known variety or purity. Quality of the seed lot is based on the word of the seed conditioner of dealer. No minimum standards exist for this type of seed.

Certification of seed does not guarantee freedom from seed-borne disease problems, but it does insure the best quality seed possible with the inspection and testing procedures currently being used.

Fieldbean seeds are routinely treated with a fungicide, insecticide, and bactericide to control root rot and damping off organisms, insects, and to kill bacterial blight organisms on the seed surface.

V. Cultural Practices:

A. Seedbed Preparation:

The soil should be tilled to remove weeds and prepare a seedbed which will provide a good seed soil contact. Fall plowing is recommended to prepare this seedbed on heavier soils in order to allow secondary tillage in the spring which can break up clods and incorporate remaining residue. If moisture is short, keep spring tillage to a minimum to prevent excessive drying of the top few inches of soil.

B. Seeding Date:

The highest yields result from plantings between May 15 and 26. Seed should be planted when the soil temperature reaches 50°F at a 3 in. depth, but after the danger of late spring frosts has passed. Growers should plant beans as early in each season as possible for maximum yield.

Certain plant or seed characteristics are affected by planting date, including days to emerge, first bud date, and date of maturity. Beans planted on May 15 take twice as long to emerge as beans planted on June 5.

Planting in mid-May results in slightly delayed flower bud development compared to later plantings, but it also results in higher yield. Early plantings permit flowering and pod set early in July, when the probability of adverse weather is lower. Later plantings are subject to high temperatures and lower soil moisture during reproductive periods, which cause shedding of flowers and developing pods. Early planting also allows completion of growth and maturity in late August. Harvest can then be completed before the wetter September weather comes.

C. Method and Rate of Seeding:

Recommended planting rates for fieldbeans depend on plant growth habit, seed size, germination rate, and experience of the grower, Table 2.

Experienced growers have produced excellent yields of most of these classes using lower populations than these values, but because of the wide range of conditions which a crop might encounter, these values should be used until you can do the job well.

All bean types showed 10 to 15% yield decreases at row spacings wider than 30 in. and 18 to 32% yield increases for narrower row widths. Because beans in narrow rows outyield those in wide, growers should consider narrow rows for erect or bush types.

Consistent yield increases are obtained for both pinto and navy beans in the narrowest row spacings in both dryland and irrigated plots. Narrow rows can increase the possibility of foliar and stem disease problems because the plant canopy is dense.

Normal planting depths of 1 to 2 in. may sometimes be exceeded to place seed in moist soil for rapid germination, but maximum planting depth should not exceed 2.5 in.

Carefully planned crop rotations are necessary in bean production, and rotations should be a minimum of 2 years, but 3 and 4 year cycles are best. Crops such as corn, wheat, oats, barley, and flax should precede beans

Table 2: Fieldbean planting rate recommendations.

Class	Seeds/lb (number)	Rate (lb/acre)	Rate (Seeds/acre)
Black Turtle	2300	45	105,000
Cranberry	1000	85	105,000
Great Northern	1000	100	105,000
Kidney	900	90-115	105,000
Navy (30 in. rows)	2500	30	105,000
(6 in. rows)		60	105,000
Pink	1700	60	105,000
Pinto	1300	60-80	105,000
Small Red	1400	75	78,000
Small White	3000	35	78,000

because bean diseases do not build up in those crops. Effective herbicides for controlling annual and perennial weeds are available in those grain crops, thereby reducing weed competition in dry beans.

D. Fertility and Lime Requirement:

Fieldbeans require good fertility to achieve high yields. Yields are generally highest when fertility is supplied to the alternate crops in the rotation rather than as direct additions to the current crop.

Soil scientists recommend a fertility program based on yield expectation, nitrate nitrogen soil test levels, previous crop in rotation, and soil organic matter level either singly or in combination. Recommended Nitrogen for fieldbeans is N (lbs/acre) = expected yield/50 to 2.5 (% soil O.M.). Adjustments can be made for a previous legume crop and manure applications. The following tables indicate the Minnesota recommendations for phosphorus, potassium and zinc requirements of fieldbeans.

Effective nodulation by nitrogen-fixing bacteria (*Rhizobium phaseoli*) is difficult to achieve in certain soil types and under certain environmental conditions. Yield increases have been reported following inoculation on fields in which nodule development was poor in previous crops. If nodule development is poor, growers should consider application of a commercially available inoculant at planting time. Inoculants come in moist, peat form, or in slightly drier granular form. Moist types are added directly to the seed. Granular types can be applied in furrow and still achieve satisfactory results. All types of inoculants should be fresh and stored in a cool, moist environment until placed in the soil at planting. Low humidities and high temperatures inactivate the live bacteria in the inoculant.

Other nutrients should be added as needed, according to soil test results. Fieldbeans will generally show yield responses to applied fertilizer if the soil tests are low to medium, but they rarely respond to fertilizer when test values are in the higher range.

When fertilizer is required, one choice is to broadcast and plow or disc it down. Row application can be done as long as the fertilizer does not come in direct contact with the developing seedling roots. A 2 in. by 2 in. placement is common; with such placement, the developing root system gradually grows into the fertilizer supply.

Table 3: Phosphorus (P) and potassium (K) recommendations for fieldbean.

Expected Yield	--- Phosphorus (P) soil test (lb/acre)[1] ---				--- Potassium (K) soil test (lb/acre)[1] ---			
	0-10	11-20	21-30	30+	0-100	101-200	201-300	300+
(lb/acre)	------ P_2O_5 to apply[2] (lb/acre) ------				------ K_2O to apply[2] (lb/acre) ------			
3000 or more	80	60	40	0	120	90	50	0
2500-2900	70	50	40	0	100	70	40	0
2000-2400	60	40	30	0	80	50	30	0
1500-1900	50	30	30	0	70	40	0	0
1400 or less	40	30	0	0	60	30	0	0

[1]For soil P and K reports in ppm. (ppm × 2 = lb/acre).

[2]Recommended rates are for total amount to apply--broadcast + row. Low rates may be row-applied.

Table 4: Zinc recommendations for field corn, sweet corn, grain sorghum, and fieldbeans.

Zinc soil test (ppm)	Relative level	Amount of zinc to apply (lb/acre)		Possibility of yield increase from zinc application
		zinc	zinc sulfate	
Less than 0.5	Low	10 to 15	28 to 42	Highly possible
0.5 to 1.0	Medium	5 to 10	14 to 28	Possible
More than 1.0	High	0	0	Unlikely

Other crops: Zinc response has not been observed on other crops in Minnesota. If zinc test is low (less than 0.5 ppm) apply zinc on trial basis only at 5 to 10 lb/acre of actual zinc.

Micronutrient deficiencies occur on certain soil types or in certain pH ranges. If a soil or tissue test indicates a deficiency, additions are likely to raise yields. Fieldbeans have a relatively high requirement for manganese. Well-drained, high pH soils, especially organic soils, are often low in this element.

Soils with high soluble salt values (as measured by electrical conductivity) are not good choices for edible bean production and should be planted to crops that are more tolerant.

E. Variety Selection:

New fieldbean varieties are constantly being developed by breeders at public universities and private companies. Hundreds of these varieties have been evaluated in the performance testing programs conducted by the University of Minnesota, North Dakota State University, as well as private bean companies and crop consulting firms. These test results usually provide data on disease and insect resistance, maturity, yield, seed quality and size, growth habit, as well as possible special characteristics such as cookability or flavor tests. The results of these tests are available from the Extension Service or from the field agronomists employed by the bean companies. They are also featured in a late winter issue of 'Bean Talk' published by the Northwest Bean Growers Association R.R. 3, Box 102, Fraze, MN 56544.

Good yielding disease resistant varieties adapted to this area are available in all the market classes described earlier in this chapter. Growers should check with the company to whom they plan to sell their production to see if they have a variety preference. This is important because canners and processors are often very particular about the specific color, size and shape of the beans they use in their products.

F. Weed Control:

Fieldbeans compete poorly with weeds and should be planted on fields with a carefully planned weed control program. Perennial weeds, both grass and broadleaf, are severe problems in edible bean fields, since annuals can be controlled with preplant or preemergence chemicals or cultivation.

A weed control program for most growers should be a combination of chemical and mechanical methods.

1. Mechanical: Mechanical cultivation should only be used during the early growth period (first 5 to 6 weeks). All cultivation should be completed before bloom, because the roots begin to spread into the row middles and can be damaged by late cultivation. Cultivation after the canopy has closed spreads disease. The best weed control program eliminates weeds early, before canopy closure, preventing competition with the beans for nutrients, light and water.

2. Chemical: Factors to consider in making chemical choices are: crops planted before and after beans in the rotation, weed species present, weather conditions at application time, and rates required. A selection of preplant incorporated, preemergence, and postemergence herbicides is available for use on drybeans. Several states including Minnesota (AG-BU-3157) and Wisconsin (A2350) have extension publications with herbicide recommendations for drybeans. Before making any decision on a chemical, growers should have the following information on each field: soil texture, percentage organic matter, weeds expected, and soil pH. The chemical and proper rate can then be matched to the field conditions, weed species, and bean type.

G. Diseases and Their Control:

Fieldbeans are susceptible to several diseases that can limit yield. Some of these diseases can accumulate in the soil of a field until beans cannot be grown. Detailed information on the major diseases of fieldbeans are described in Edible Bean Diseases and Disorder Identification, North Central Regional Extension Publication 159. Common blight, white mold, rust, halo blight, Rhizoctonia, Pseudomonas brown spot, Fusarium, Bean common mosaic, Pythium (damping off), and Anthracnose are the diseases which can attack fieldbean.

The following field management procedures can help reduce disease in edible bean fields:

1. Refuse remaining in a field after combining should be buried by tillage to promote its decay and reduce spread of disease organisms to other fields or farms.

2. Proper weed control during the growing season is important because some disease organisms can infect weeds growing in the field. White mold, for example, can infect ragweed and increase white mold problems in a field.

3. Use only disease-free seed to prevent introduction of bacterial blights, anthracnose, and common bean mosaic which are seed-borne.

4. Use disease resistant varieties.

Chemicals applied to dry beans are called protectants because they protect the seed or plant from initial disease infections or reduce disease spread. These chemicals establish a protective blanket on the surface of the seed or plant (surface protectant), or by absorption into the plant (systemic fungicide), which prevents infection by specific pathogens.

Timing of these protectant sprays is critical. Spray applied at later stages of plant growth are less likely to show economic returns but do prevent the further development of the disease.

The use of systemic fungicides offers the potential for improved disease control. Once absorbed by the plant tissue they are less subject to weathering and are often active against newly established infections. Careful

monitoring of crop and weather conditions can lead to the accurate timing of applications, improved disease control and significant reduction in fungicide use. An important limitation in use of systemic fungicides is the selection of fungal strains that are resistant to specific systemic fungicides. This risk can be substantially reduced by combining systemic and protected fungicides or alternating treatments between different fungicides.

H. Insects and Other Predators and Their Control:

The fieldbean crop in Minnesota and Wisconsin has generally been free of serious insect problems, although several different species of insects are encountered in fields. Occasionally one or more of these insects can become abundant enough to cause yield loss. It is important, therefore, to be aware of insect pests so they can be controlled before major losses occur. For some pests, chemical treatment, along with crop rotations, can be used to reduce the damage.

A list of common fieldbean insects in Table 5 should assist you with field evaluations. Only the most common ones are included. Other less obvious problems can appear which will require the services of a professional consultant or extension agent to ascertain which insect species is causing the problem.

Always read product labels and consult with extension specialists and custom applicators when you have questions.

Insecticides on fieldbeans must be applied carefully because minimal processing of the crop occurs between the grower's field and the consumer's product. Strict adherence to label restrictions will help avoid problems in selling the crop.

I. Harvesting:

Fieldbeans are usually harvested with puller-cutters, followed by windrowing and combining. A puller-cutter has heavy, V-shaped blades that move just below the soil surface, cutting off or uprooting the plants and turning them over into windrows. This process is best done early in the morning when the plants are damp to minimize shattering.

After sufficient time in the windrow for drydown, combining is done using slow cylinder speeds to prevent seed damage. The combine should be kept at full capacity by using large windrows or faster ground speeds to move plant material into the threshing mechanism and prevent damage to seed. Periodic adjustments in the cylinder-concave clearances are necessary to prevent seed cracking if moisture content of the beans changes during combining.

Bean ladders or belt conveyors should be used to move beans, especially when seed is dry. If augers have to be used, they should be run full to reduce damage. Fieldbeans vary in susceptibility to damage. The various classes and their damage sensitivity are:

Table 5: Possible fieldbean insect problems.

When	Where	What
At emergence	Evidence of poor stand, wilting seedlings or cutoff plants	- White grubs - Wireworms - Seedcorn maggot - Cutworms
During early seedling growth	On leaves	- Bean thrips (not common in Minnesota) - Slugs
Late season plants	On leaves, flowers and pods	- Green cloverworm - Bean leaf beetle larvae - Leafhopper - two-spotted spider mite (rarely in Minnesota) - Aphids - Plant bugs
During storage or during cleaning	Seed	- Plant bugs - Bean weevils

Class	Damage sensitivity rating
Red kidney	High
Black turtle	High
Small red	Medium
Great northern	Medium
Navy	Medium
Small white	Low
Pink	Low
Pinto	Low

Adapted varieties of navy, dry red and kidney beans have a determinate growth habit (bush), so the beans are more uniform in maturity. Some growers combine navys directly, but this method can result in large losses if the combine is not equipped with a floating cutter bar and automatic header control. Direct combining also causes considerable seed damage if the concave clearances are not carefully adjusted. Direct combining reduces machinery costs and field time and reduces the risk of quality and yield loss during rainy periods.

Pinto beans have an indeterminate growth habit (vines) and generally are pulled when most pods are yellow and seeds have visible streaks. Immature beans continue to dry in the windrow. Pintos are generally ready to combine after 4 to 10 days in the windrow. Beans with moistures as high as 18% are safe to combine, with safe short-term storage moistures being 16.5% and longer term storage 15.5% moisture or less.

J. Drying and Storage:

When prices are low, growers store the crop until prices improve. A storage facility for a crop that is used directly by humans without further processing must be protected from water; from contamination by other crops, chemicals, or odor; from rodents; from insects; from fungi; from fire; and from temperature extremes.

Mold development on beans in storage is influenced by the temperature of the beans and by the relative humidity of the air in the spaces. For all grains, 75% relative humidity in these spaces will provide safe storage, if normal temperatures are maintained. For fieldbeans, 75% relative humidity occurs at bean moisture contents of 16 to 16.5%.

In Minnesota and Wisconsin, bean quality can be easily maintained at low temperatures (35 to 55°F) in storage shortly after harvest if bin aeration is provided. These low temperatures slow mold development. A small aeration fan ⅓ to ½ horsepower) and a 12 in. diameter perforated duct can aerate up to 3,000 hundredweight of beans.

If beans need to be dried prior to storage, two methods can be used:

In Storage Bins With Heated Air. The bin must least 5 cubic ft per minute per hundredweight of beans in storage. The fan must be run continuously until the beans at the top are dry. The fan will provide about 2°F temperature increase, which will lower the relative humidity of the spaces in the bin. With these air-flow rates and the cool weather normally present after harvest, you can maintain beans in good marketable condition.

Heated-Air Dryers: High air-flow heated dryers (batch, continuous flow, or batch-in-bin) can be used if temperatures are lowered to prevent seed damage.

Dryer operating temperatures depend on air flow, bean moisture content and the weather. It is best to start with small temperature increases (2 to 5° F over ambient temperature) to determine the specific operating temperature to use in each situation.

VI. Yield Potential and Performance Results:

Yields in Minnesota average between 1,200 and 2,000 lbs/acre for the most commonly grown classes, although research plot yields and fields of certain top growers have exceeded 3,500 lbs/acre. Most of the bean acreage in Minnesota and Wisconsin is devoted to pinto, navy and dark red kidney classes, but smaller acreages of great northern, pink, small red, black turtle, cranberry, adzuki and swedish brown classes have been grown.

On nonirrigated soils in northwest Minnesota, fieldbeans are included in a small grain rotation because of high cash return. Fieldbeans are used in rotations in central and north-central Minnesota where soybeans do not show increased yield from irrigation and in central and west-central Wisconsin where irrigation is available. They are not widely grown in the major soybean areas of southern Minnesota and Wisconsin because they have not been competitive with cash returns from soybeans.

Bean production requires a greater attention to field management than do some of the other commonly grown field crops. Since beans are a special use crop, market demand is variable.

The advantage of growing several different types of fieldbeans each year is that each class may have a different price in the market. Such diversity can allow a producer to stabilize income. Local markets have not been developed for some of the lesser grown types so you should obtain a contract or a written price quote before planting.

VII. Economics of Production and Markets:

Farmers often sign contracts with bean brokers, processors or canners for a portion of their anticipated production prior to planting. These contracts often specify variety and/or market class, moisture content, physical quality and delivery point as well as price per pound. The quantity contracted is often about one-half of the anticipated yield/acre so that cash costs, etc. can be recovered if the actual yields fall below anticipated values. These contracts can have "act of God" clauses which release the grower if drought, hail, or insect problems reduce yields significantly.

Prices paid for fieldbean vary widely from year to year and prices for each market class varies depending upon supply and demand. Prices, at harvest, have ranged from seven cents to fifty-three cents per pound in recent years. Preplant contracts during the recent production years varied between sixteen and twenty-five cents per pound.

Tables 6 and 7 provide some typical cash, overhead and total costs of production under dryland conditions or under irrigation in Minnesota and Wisconsin. Cash costs include fertilizer, pesticide, seed, fuel costs, etc. while overhead includes depreciation on equipment, labor, property taxes, land interest charges, insurance, etc.

Minnesota studies estimate that the average cost to grow a pound of fieldbeans is somewhere between fifteen and eighteen cents. Farmers should calculate their own cost of production in order to ascertain the yield level needed to make a profit. A per pound price calculation will allow you to obtain the contract price which will provide you the greatest profit.

VIII. Information Sources:

- Cultural and Chemical Weed Control in Field Crops. AG-BU-3157. Minnesota Extension Service. University of Minnesota.
- Dry Bean Production Handbook. A-602 (Revised). Cooperative Extension Service. North Dakota State University, Fargo.
- Edible Bean Disease and Disorder Identification. North Central Regional Extension Pub. 159. Minnesota Extension Service. Univ. of Minnesota and University of Wisconsin-Extension.
- Recognition and Management of Dry Bean Production Problems. North Central Regional Extension Publication 198. Minnesota Extension Service. Univ. of Minnesota and University of Wisconsin-Extension.
- Varietal Trials of Farm Crops. Miscellaneous Report No. 24. Minnesota Agricultural Experiment Station. University of Minnesota. St. Paul, MN.

Table 6: Fieldbean costs of production (Navy, Pinto, Kidney).

	$/acre	
	Dryland	Irrigated
Cash costs	112	125
Overhead costs	121	195
Total	233	320

Table 7: Returns over cost of production at 100%, 75%, 50% of listed yield (Beans at 0.23/lb).

	Dryland Yield (1600 lb/acre)		Irrigated Yield (2100 lb/acre)	
Yield level	Cash	Total	Cash	Total
100%	$223	$112	$335	$160
75%	$147	$ 26	$237	$ 42
50%	$136	$ 15	$117	$ 78