University of Idaho Extension

#73118

Project revised 2 / 04

Bean Grower Workbook

Each club member is required to keep a businesslike record of the projects carried out each year. It is **good business** to keep **complete** and **accurate** records. The purpose of this record book is to let you know how you stand in dollars and cents after completing the year's work. It is an important part of your club project, as it will help others know what you have done in your club work and how well you have succeeded. Be sure to take good care of it and keep it up-to-date.

Keep your record book current. As soon as an activity is completed, such as selecting land, fertilizer, or other materials, enters it in the proper space in your record book. In addition, when you finish any project-related work, make an entry in your book. This is the best way to keep accurate, useful record of your activities.

Be sure to read the instructions on each page. Make sure you understand them, and know how to make proper entries in the book. Your parents or your leader can help you get started.

When your record book is complete, turn it over to your local 4-H leader. Your leader will check it for accuracy, sign it, and forward it to your county extension educator.

Save all pictures and newspaper clippings relating to your project. If your record is selected to represent the county in some project or other club activity, you will have all of the material needed to show what you have done. Ask your local leader or county extension educator to explain the awards.

Year 20____		
Name		Age
Mailing address		Birth date Month / Day / Year _____/_____/_____
School grade complete	Years in 4-H/FFA	Years in 4-H/FFA Bean Project

Bean Grower Project

OBJECTIVES

1. To stimulate interest in growing beans
2. To learn effective crop management for bean production including
    - Fertilization
    - Insect control
    - Marketing
    - Irrigation
    - Disease control
    - Weed control
    - Harvesting

    And to learn how each affects crop quality.
3. To learn about the bean industry and its opportunities
4. To gain self-confidence and learn responsibility through experience and successful completion of the project.

REQUIREMENTS

You will:

1. Grow a minimum of one half acre of beans as measured by the club leader, instructor, or a field person.
2. Supply a description of land where you grow beans.
3. Complete a pesticide report (under chemical costs).
4. Be an active 4-H/FFA member and fulfill meeting and demonstration requirements.
5. Own your own project with a bonafide agreement or contract with your parent or landlord covering machinery, labor, seed, share, etc. Your parent and your leader must sign this.
6. Have your parents or legal guardian co-sign the contract with the marketing company, if one.
7. Attend the annual field tour of bean projects and give an oral presentation on management practices (what it takes to produce the crop) during the tour.
8. Have an updated record book available for review during the field tour.
9. Exhibit your project at the county fair or an approved alternative.
10. If your crop is not harvested by fair, finish and turn in workbook to your county extension office on or before January 5 of the next calendar year.
11. Watch your samples being graded by the USDA. The field man will set up the grading at a time when you are able to attend.
12. *Individual project weight slips or market receipts **must** be included with the record book at project completion.*

EXHIBITS

Display of beans according to the local county fair book.

OR

Display of beans at a public exhibit other than the county fair. Talk to your leader and/or extension educator for approval.

AND

Display your completed 4-H project record book and updated Bean Grower Workbook at the fair.

A special thanks to the Twin Falls County Extension Office for their help in developing this project. Revised February 2004.

Introduction

4-H members taking bean production for a project may grow beans for consumption or for use as seed. Beginners may want to grow field beans and select the variety most commonly grown in their community. Field beans are grown to produce dry edible beans such as those used in pork and beans. Field beans are usually better adapted so the 4-H member is more likely to have a successful experience.

Advanced members may wish to grow garden seed beans or certified bean seed. Garden seed beans are usually grown under contract to a seed company and will be used to produce string beans for processing or for home garden use. Certified bean seed is grown for use as seed for the production of a commercial crop of dry edible beans.

Subject Matter Topics by Meeting

Meeting 2
Agreements for use of land, machinery, water, etc.
Seed company contracts
Bean varieties
Soil tests
Meeting 3
Seedbed preparation
Fertilization
Planting
Meeting 4
Irrigation
Cultivation
Weed control
Meeting 5
Disease Insects
Meeting 6
Harvesting
Marketing
Arrangement for fair exhibits or shows
Other Meeting Ideas
Field trip to cleaning plant to learn about cleaning, grading, and storing.
Work sessions on workbook financial statements

General Meeting Format

Each meeting should have a similar format, with different subject matter topics.

- At the beginning of each meeting, the club president conducts the business meeting.
- Subject matter is presented by a local leader, older 4-H member, extension educator, or another authority.
- A topic of discussion and project progress is assigned for the next meeting.
- Record books are checked to make sure they are current and filled out correctly.
- End the meeting with some type of game or recreation.

First Meeting

This is the organizational meeting. The leader can preside or a temporary chairperson can be appointed until regular club officers are elected. If this is a continuing club, the outgoing president will preside.

Business Meeting - Explain the requirements of a standard club and what 4-H membership means. Explain the duties and responsibilities of officers and members. The leader, county extension educator, or an experienced, older 4-H member can do this.

- Elect club officers
- Select name for the club
- Adopt a constitution
- Set time, place, and date of meetings

Prepare a brief outline of the main events of the club program for the year:

- Six or more regular meetings
- Club picnic, recreation
- Project tour and presentations
- Demonstrations and crop judging practice
- Achievement day
- Community project

Discuss the project subject matter:

- Distribute project literature.
- Discuss beans in Idaho and review requirements for project.

Subject Matter Content

Club Member Responsibilities

Each 4-H club member should manage their crop and keep accurate, up-to-date records throughout their project. Their records should describe the work done in growing, harvesting, and marketing their crop. The records should also include all financial data, which will show the profit or loss from their project.

All record books must be summarized before the project is displayed at county fairs. In order to do this, it may be necessary to estimate the yield, the harvesting costs, and the cost of other uncompleted jobs. Estimating is good practice, and it gives 4-H members an opportunity to test their judgment. The leader, parent, or crop consultant can help them with this process. When the project is completed, club members will compare the actual results with their estimations.

With the help of their parents, 4-H club members will need to select the field or plot of ground to be used for their bean project before the project begins.

The size of the project field will depend on the ability of the 4-H member, the arrangement with the landlord, and possibly the contract agreement. Club members should have a written agreement with their parents, stating the rent for the use of the land. It should also describe arrangements for the use of machinery, labor, fertilizer, and harvesting equipment. If the beans are grown under contract, the 4-H member should sign the contract with the contracting company as well.

The age of the club member should be considered when deciding the size of the project. Club members who are beginners or under 14 years old should start with a half-acre plot. Those with experience or older club members should be capable of growing an acre or more.

After the bean project is completed, members will write about their bean growing experiences in this project. This is part of the record book and must be completed.

Do You Know Beans About Beans?

Do you know that Idaho grows more garden bean seed than any other state? In this country, Idaho is number one in the production of dry field beans. Beans thrive in our state because we have climate and soil conditions that enable us to grow high-quality, disease-free seed.

The $20 million annual bean crop is an important contribution to Idaho's agricultural income. Most of the beans are grown in south-central and southwestern irrigated counties. The heaviest producing areas are in the counties along the Snake River from Rupert and Burley west through Canyon County. Limited production of beans can be found without irrigation in the northern counties of Latah, Nez Perce, Clearwater, and Lewis.

Southern Idaho counties grow mostly Great Northern, Pinto, and Red Mexican varieties with some Michelite, Cranberry, Kidney, and Sanilac varieties. Many different varieties of garden seed beans are grown. Northern Idaho counties produce mostly small white flat beans.

The first thing 4-H members must do before starting their bean project is to become familiar with the different marketing classes of beans grown in their community or county. Great Northerns are medium-sized white beans. Pintos are similar to Great Northerns in size and are brown and buff as their name suggests. Red Mexican beans are smaller than pintos and are a deep red color.

Beans are naturally adapted to warm climate areas. Many years of breeding and selecting by plant scientists have created varieties that are adapted to Idaho conditions. Beans require from 85 to 110 frost-free days in order to mature properly.

What kind of beans should you plant? Because of the improvement in adaptability of beans to climate, 4-H bean growers can choose to grow any kind of dry beans and select the variety that has proved to perform best in their area. Seek advice from the county extension educator, parents, or neighboring bean growers. Remember to always plant certified seed.

Certified Seed

The Idaho Crop Improvement Association is responsible for the certification of seed. They have field specialists who inspect fields and harvested crops to be sure that they are a pure variety and that they are free of disease and noxious weeds. Each bag of seed should have the tag of the Crop Improvement Association attached to it. This tag assures the grower that the seed is of good quality, is free of varietal mixtures, seed-borne diseases, and objectionable weed seed, and that it will germinate at least 85 percent or better. Garden-variety seed will not carry the tag and seal of the Crop Improvement Association, but will be verified by the contracting company.

In order to reduce disease problems, plant the best of the most recently developed varieties. University of Idaho plant breeders have developed new cultivars for each type of bean. These new cultivars are resistant to many of the virus diseases that may cause heavy losses in bean production. Because of this bean development program, seed beans from Idaho are in demand in other bean-producing areas.

Crop Rotations

Crop rotation is not as important in bean production as it is in the production of most other crops. We say this because it is possible to grow beans on the same land year after year. Of course, it would be much better to follow a rotation of crops in order to produce high quality, high yielding beans. Beans will fit into almost any rotation program. They will grow satisfactorily following alfalfa, clover, cereals, potatoes, peas, beans, or rye grown for green manure. The most desirable rotation is one that grows beans only every 3 or 4 years on any one field. The least desirable place in the rotation for beans is after beans.
When planting beans after alfalfa, it is advisable to kill the alfalfa with an herbicide so that alfalfa crowns will not cause cultivation problems. Consult your county extension educator or a reputable Chemical dealer for application information for your area. It is best to kill alfalfa in the fall so that the chemicals will have time to take effect and to reduce any possible hazard to the following crop of beans.

If large quantities of crop residue have been incorporated into the soil before planting your bean crop, then additional nitrogen (N) fertilizer may be needed. Soil nitrogen (N) is immobilized (becomes unavailable for plant uptake) during decomposition of these residues. Therefore, sufficient N may not be available for early growth of the bean crop. Recommended N from the soil test should be increased by about 15 lb N per ton of residue, but do not exceed 50 lb additional N per acre. Be sure to plow the crop residue before any seed starts to develop.

Land Preparation

Beans should be planted in a mellow, firm seedbed. There are many ways of preparing a seedbed depending on the machinery available. Fall plowing is desirable for either non-irrigated or irrigated land. Spring plowing is also satisfactory in irrigated areas. Plowed land should be worked down with a harrow to the point that it can be furrowed out and irrigated before planting. After the pre-plant irrigation, let it dry to a workable condition, then disk and harrow for planting.

In non-irrigated areas, disking and harrowing ahead of planting will put the soil in good planting condition as well as do an effective job of controlling early weeds.

Fertilization

Beans, like other crops, thrive in fertile soil. Applying manure before beans has always been considered a good method of fertilizing beans. An application of zinc is usually desirable. Nitrogen and phosphate fertilizers can be applied to the bean crop but it is preferable to fertilize the other crops in the rotation and grow the beans on residual fertilizer. Before buying fertilizer for your bean crop, have a soil test done for the field, then talk to your county extension educator and consult University of Idaho EXP 282, *Bean Production in Idaho*.

Weed Control

Weeds are always a problem to the bean grower. Weeds have been controlled by cultivation for many years, and some growers achieve excellent results with this method. Others have found they get better weed control with chemicals.

Cultivation begins with preparation of the seedbed. This process itself does a good job of controlling early germinating weeds. However, pre-plant irrigation and the following tillage kill more weeds. After planting, beans may be harrowed with a finger weeder or other flex tine harrow, if necessary, to control seedling weeds. When the beans have emerged in obvious rows, cultivation with conventional down-the-row equipment should be started by the time the weed seedlings are noticeable. Cultivation need only be done when there is a developing weed population. Any combination of tools is suitable. Soil is often pushed up around the bean plants in order to cover up small weeds within the row and to encourage the growth of secondary roots that support the bean plant when the taproot is destroyed by root rot.

When it is time to irrigate, furrowing shovels will be used to make the irrigation furrow if the field is surface irrigated. Usually, it is necessary to cultivate after each irrigation until just before row closure, or lay by.

After lay by, it may be necessary to go through your bean field with a hoe and take out the weeds that escaped cultivation as well as the late emerging and maturing weeds such as nightshade.

Weeds can also be controlled with herbicides, which are usually applied to the soil and incorporated before planting. If a chemical is used, it should not be necessary to go through the field to hoe or pull escaped weeds. Nightshades are resistant to some chemicals. Consult your county extension educator or a reputable chemical dealer for more information on chemical weed control.

Irrigation

Beans use about 16 to 19 inches of water during the growing season. This water demand can be met by stored soil moisture, precipitation, or irrigation. Pre-plant irrigation is necessary so that there is enough moisture for emergence and plant establishment. The first irrigation after crop emergence is very important. If the plants become too water-stressed at this point, the risk of dry root rot disease and crop loss increases. During early season irrigation, it is important to not let the crop deplete the soil moisture level below 50 percent available moisture. Allowing further moisture depletion will result in crop water stress. Late in the growing season, as the beans mature, it is acceptable. Allow 60 percent depletion of available water before irrigating.

When the soil moisture level is reduced, the bean leaves will be darker green in color. When the field has a black look, it is likely drier than it should be. Experienced irrigators can often use the color of the bean

plants to determine when to irrigate. Inexperienced irrigators should check the soil using the "feel and appearance" method to determine moisture content. The county extension educator or a field representative can help you make this determination.

Insects

Many kinds of insects can cause trouble in bean production. Wireworm and the seed corn maggot may be a problem after planting until the bean plant is established. Beet leafhoppers, lygus bugs, and the two-spotted spider mite may be a problem from the time the beans emerge until after flowering and early pod set. The red-backed cutworm and the western bean cutworm cause the greatest problem late in the season after the pods and beans are developed.

It pays to inspect the bean field regularly. Get help if any condition is noticed that you think might be insect damage. You're county extension educator or the field specialist for local bean dealers can help you identify and control insect problems.

Diseases

An understanding of some bean diseases is important for 4-H members. Bacterial diseases are seed borne and are the most serious. Common blight, halo blight, and bacterial wilt were all introduced into the state with infected seed. None of them persist very long under our growing conditions except where beans are grown under sprinkler irrigation. The bacterial blights are recognized by water-soaked spots on the leaves, stems, and pods and by the reddish brown discoloration that soon develops. Bacterial wilt causes the plant to wilt and the stem to break off at the node.

Fungal diseases cost bean growers the most money but ordinarily do not prevent the production of a crop. Root rots are the most common fungal disease. They cause the root to die and rot off, which deprives the plant of an adequate supply of water and soil borne nutrients. However, bean plants can produce new side roots that take the place of the primary roots that have died.

Sclerotinia wilt, or white mold, is a serious fungal disease, especially under conditions of high humidity. The plant develops white mold on the pods and stems that can result in significant yield loss. Small black sclerotia (charcoal-like particles) form in the crotches of the plant and later drop to the soil where they keep the infection going.

Virus diseases are the mosaics. Mosaic-infected beans have crinkled yellowish leaves often drawn up into distorted shapes. Most virus-infected beans are dwarfed and, under severe conditions, never produce more than a few pods. Some varieties are resistant to most of the virus diseases (see UI PR 314 *Idaho Certified Seed Selection for Varieties of Dry Beans* for more information).

Other problems may develop occasionally. If you think your bean field might be unhealthy, ask your county extension educator for help.

Harvesting

Harvesting your crop should be a rewarding experience after the exacting care and hard summer work you have put into it. There is no point in growing a good crop only to lose it at harvest time. It is important to harvest all of the beans and not leave part of them on the ground. It is also important to handle the beans carefully so that they are not cracked or broken. If you have a seed crop, the way you harvest will determine the percentage germination. If germination is too low, the crop is not saleable.

Beans should be cut and windrowed when most of the pods are yellow and most of the seeds are mature. Usually the bean cutter puts two bean rows into one cut row. Then, a side delivery rake is used to put two cut rows into one large windrow. The combine then picks up the windrow and threshes out the beans.

Cutting and windrowing is usually done early in the morning or during the night when there is dew to prevent shattering. After getting the beans in the windrow, it takes 7 to 10 days for them to cure and be ready for threshing.

Care of the seed begins at the combine. The cylinder speed should be reduced as much as possible and long drops in the separating and loading operations should be prevented. The cylinder should run between 250 and 400 RPM to avoid injury to the beans. The clearance between the cylinder and the concave bar should be wide enough to allow the beans to pass through without injury. If you notice cracked or injured beans during harvest, stop the machine and make adjustments immediately.

Marketing

Beans are usually marketed through bean warehouses, cooperatives, or contracting companies. After harvesting, beans are taken to the cleaning plant where they are processed to remove dirt and rocks as well as cracked, broken, and shriveled beans. You are paid for the good beans. Unless your beans are contracted, you can decide when to sell. If the market is good at harvest time, it usually pays to sell at that time, although many growers hold their beans until sometime later in the year when they think the price will be better.

Field Tour and Presentation

The field tour involves a visit to each member's bean field.

- Arrange for a transportation committee. For safety's sake, it would be wise to use one car or truck driven by an older club member or leader.
- Arrange a time and place for the tour.
- Create a committee to decide on the lunch and drinks, location, and provider.
- Arrange the route of tour, including where you will go and when you plan to be there. A well-planned tour will allow time for everyone to see all the club projects and have time for lunch and recreation.
- At each stop, the 4-H member will give a presentation about their project. If the project is above average or below average, have the club member tell what happened. Presentations need to have a time limit in order to stay on schedule.
- Designate a recreation leader to be in charge of a program at the lunch stop. This person will obtain any necessary equipment.
- Learn by doing.

Preparing a 4-H Bean Exhibit

Your bean exhibit should represent your crop and what you have done with it.

- **If your beans are harvested:** Exhibit a one-quart sample. The sample should have been machine-cleaned so that dirt, rocks, chaff, weeds, and broken beans are removed. While it is not necessary, if you want your exhibit to look its best you should hand pick it. To hand pick a sample, spread it out under good light where you can see each bean. Using forceps, examine each bean. Discard discolored, deformed, cracked, or otherwise damaged beans. After completing the hand picking, the beans may be polished by using a cloth to remove the dust.
- **If your beans are not harvested:** Collect 20 representative pods of beans. The pods should be as free of disease symptoms as possible. They should be uniform in size and as mature as the season permits.

Field Map

Show the location of your bean project in relation to the rest of the farm. Indicate the number of acres in your project on the map. Show how the irrigation system is laid out for your project, including details such as head ditches, field ditches, wheel lines, sprinklers, etc.

NORTH

Number of acres in this year's project _____
Number of acres in last year's project _____

Field Map Soil Information

Soil type _____ Soil depth_____ Soil texture _____

Drainage _____Percent Slope_____%

What was the crop rotation over the past three years?

Last year_____Two years ago _____Three years ago_____

How much fertilizer was applied to the previous crop?

Nitrogen (N) _____Phosphate (P) _____Potash (K)_____

Other nutrients and amounts_____

When was manure last applied to soil? _____

Soil Test Results (REQUIRED):

Soil pH _____ Phosphorus (ppm P)_____ Potassium (ppm K) _____

Soil organic matter _____ %

Nitrogen

Soil depth (inches)	Nitrate nitrogen (ppm N)	Multiply by 4	Available N (Lb per acre*)
0-12	_____	x 4 =	_____
12-24	_____	x 4 =	_____
Total	_____	x 4 =	_____

ppm multiplied by 4 equals available N in lb per acre

Attach Soil Test to Workbook Book Here:

General Information About Bean Project at Start of Year

Bean Project for year_____

Why did you choose a bean project this year?

What do you expect to gain, accomplish, or demonstrate from your project this year?

Project Management Agreements

Describe any agreements you have made concerning land, water, equipment, seed, fertilizer, chemicals, labor, planting, cultivation, harvesting, marketing, etc.

SIGNATURES	
Member:	Date:
Landlord:	Date:
Leader:	Date:

Crop Production – Beans

1. State how your bean project was affected by:

Climate_____

Insects_____

Diseases _____

Weeds _____

Other _____

2. What control methods did you use to protect your bean crop from:

Insects _____

Diseases_____

Weeds _____

3. How did your field compare with the average in the community and on your farm?

4. How did you determine your yields?

5. What soil conservation practices did you use this year? _____

6. Do you plan to continue this project again next year? Why or why not? _____

7. If you were to continue this project for another year, explain what management or farming practices you would do differently.

Beans Budget

(TO BE FILLED OUT AT BEGINNING OF PROJECT YEAR, USE YOUR BEST ESTIMATE OF WHAT IT WILL TAKE TO GROW YOUR CROP)

Number of acres in project _____

ESTIMATED INCOME PER ACRE ($)	Member	Landlord	Total
1. Estimated yield per acre (cwt)			
2. Estimated price per unit (cwt)			
3. Estimated gross income per acre (line 1 X line 2)			
4. Other income (rental income for landlord)			

ESTIMATED COSTS PER ACRE ($)	Member	Landlord	Total
4 Cash Rent			
5. Land Cost (mortgage, taxes, insurance)			
6. Water and pump cost (If separate from land cost)			
7. Machinery and equipment			
8. Harvest and hauling			
9. Fertilizer			
10 Seed			
11. Chemicals			
12. Labor			
13. Miscellaneous costs			
Total estimated costs per acre (Total for line 4 through 13)			
15 Estimated net income per acre (line 3 minus line 14)			

Example Budget

Table 1. Costs And Returns Per Acre to Produce Dry Beans
SCI Commercial

	Quantity Per Acre	Unit	Price or Cost/Unit	Value or Cost/Acre
Gross Returns				
Dry Beans	22.00	cwt	19.20	422.40
Total Gross Returns For Dry Beans				422.40
Operating Costs				
Other:				
Crop Insurance	1.00	acre	10.50	10.50
Irrigation:				
Water Assessment	1.00	acre	24.70	24.70
Irr. Repairs - qp	1.00	acre	2.18	2.18
Labor (irrigation)	3.85	hr	7.80	30.03
Custom:				
Custom Fertilize	1.00	acre	4.75	4.75
Custom Cut/Rake	1.00	acre	20.00	20.00
Custom Combine	22.00	cwt	1.41	31.02
Fertilizer:				
Dry Nitrogen	25.00	lb	0.31	7.75
Dry P2O5	100.00	lb	0.19	19.00
Zinc	5.00	lb	0.20	1.00
Pesticide:				
Sonalan	1.50	qt	7.25	10.87
Treflan 4EC	0.50	qt	5.00	2.50
Seed:				
Bean Seed	100.00	lb	0.27	27.00
Labor (machine)	3.43	hrs	11.70	40.17
Labor (non-machine)	0.40	hrs	6.90	2.76
Fuel - Gas	1.69	gal	1.54	2.61
Fuel - Diesel	17.84	gal	1.07	19.08
Lube				3.25
Machinery Repair				13.45
Interest on Operating Capital @ 7.50%				7.86
Total Operating Costs per Acre				280.49
Net Returns Above Operating Costs				141.91
Cash Ownership Costs				
General Overhead				10.08
Land Rent				100.00
Management Fee				21.12
Property Taxes (Machinery)				0.00
Property Insurance				1.41
Total Cash Ownership Costs per Acre				132.61
Non-Cash Ownership Costs (Depreciation and Interest)				
Equipment				54.41
Total Non-Cash Ownership Costs per Acre				54.41
Total Costs per Acre				467.51
Returns to Risk				-45.11

Cash Flow Worksheet

Item	Month												
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
Income (1) Contracted beans													
(2) Uncontracted beans													
(3) Total Income													
Costs													
(4) Land													
(5) Water													
(6) Equipment													
(7) Harvesting													
(8) Hauling													
(9) Fertilizer													
(10) Seed													
(11) Chemicals													
(12) Labor													
(13) Insurance													
(14) Other													
(15) Other													
(16) Total Costs													
(17) Profit													
(18) Net Cash Flow													

Profit (17) = Total Income (3) minus Total Costs (16); **Net Cash Flow (18)** = month-by-month tally of the profit figure (sum the profit figures from the previous months); Profit (17) and Net Cash Flow (18) will be negative until revenue is received in August.

Example Cash Flow

Table 2. Monthly Summary of Cash Expenses per Acre — EBB3-DB-01

	Oct 00	Nov 00	Dec 00	Jan 01	Feb 01	Mar 01	Apr 01	May 01	Jun 01	Jul 01	Aug 01	Sep 01	Total
Preharvest:													
Disk	7.74												7.74
Plow	11.20												11.20
Harrow							9.64		2.14				11.79
Crop Insurance							10.50						10.50
Assessments							24.70						24.70
Repairs							2.16						2.16
Irrigate							4.29	4.29	8.58	8.58	4.29		30.03
Fertilize								32.50					32.50
Ground Spray								15.33					15.33
Bed Up								5.44					5.44
Seed Hauling									1.63				1.63
Plant									40.63				40.63
Cultivate									7.28	7.28			14.57
General Pickup Use	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	1.10	13.16
Total Preharvest Costs	20.04	1.10	1.10	1.10	1.10	1.10	52.41	56.65	61.56	16.96	5.39	1.10	221.61
Harvest:													
Cut and Windrow Beans												20.00	20.00
Combine												31.02	31.02
Total Harvest Costs												51.02	51.02
Interest on Operating Capital	0.13	0.13	0.14	0.15	0.15	0.16	0.49	0.65	1.24	1.34	1.38	1.70	7.66
Operating Costs per Acre	20.17	1.23	1.24	1.24	1.25	1.26	52.90	59.51	62.80	18.31	6.77	53.82	280.49
Cash Ownership													
General Overhead	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	10.08
Land Rent						100.00							100.00
Management Fee	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	1.76	21.12
Property Insurance							1.41						1.41
Cash Ownership Costs	2.60	2.60	2.60	2.60	2.60	102.60	4.01	2.60	2.60	2.60	2.60	2.60	132.61
Total Cash Costs per Acre	22.77	3.83	3.84	3.84	3.85	103.86	56.90	62.11	65.40	20.91	9.37	56.42	413.10

Calculating Water Applied By Revolution or Set

Step 1:

Determine the water depth in 24-hour inches for each irrigation set or cycle from Table 1 (see p. 10), using the appropriate water flow for your system. The head size may be measured in cubic feet per second, Idaho Miner's inches, or gallons per minute.

Step 2:

Select an appropriate irrigation system efficiency from Table 2 on page 10.
Select lower values for 24-hour sets, larger spacing, or windy conditions.

Step 3:

Calculate the application depth using either equation 1 or equation 2, depending upon the irrigation system type.

Equation 1: Water application depth per revolution for center pivot, or per pass for linear-move irrigation systems or partial center pivot system:

Inches of water applied per revolution of a center pivot =

$$\frac{\text{(Table 1 answer)} \times \text{(Table 2 answer1)} \times \text{number of days per set}}{\text{acres} \times 100}$$

Example: 130 acre pivot, with flow equal to 900 gpm, efficiency rating (from Table 2) = 85%, 2.5 days per revolution

Depth of water applied per revolution = [47.60 x 85 x 2.5]/[130 x 100] = 0.778 inch

Equation 2: Water application per set for set-move sprinklers or gravity systems:

Inches of water applied per acre for non-center pivot systems =

$$\frac{\text{(Table 1 answer)} \times \text{(Table 2 answer)} \times \text{hours per set}}{\text{acres} \times 24 \times 100}$$

Example: 6 acres, border irrigation, flow equal to 50 Idaho Miner's inches, efficiency rating (from Table 2) = 50%, 12-hour set depth = [23.8 x 50 x 12]/[6 x 24 x 100] = 0.99 inch

Table 1. Calculation of water depth (24-hour inches) applied by head size

Water flow (Head size)			
Cubic Ft per second	Idaho Miner's inches	Gallon per minute	24-hour inches per acre
0.20	10	90	4.75
0.40	20	180	9.52
0.60	30	270	14.28
0.80	40	360	19.04
1.00	50	450	23.80
1.20	60	540	28.56
1.40	70	630	33.32
1.60	80	720	38.08
1.80	90	810	42.84
2.00	100	900	47.60
2.20	110	990	52.36
2.40	120	1080	57.12
2.60	130	1170	61.88
2.80	140	1260	66.64

Table 2. Typical irrigation system application efficiencies.

System Type	Irrigation System Efficiency* (%)
Surface Systems	
Furrow	35-65
Surge	50-55
Cablegation	50-55
Sprinkler Systems*	
Set-move	60-75
Solid-set	60-85
High pressure center-pivot	65-80
Low pressure center-pivot	75-85
Linear-move	80-87
Microirrigation	
Drip	90-95

- Use lower efficiencies with larger spacing and windy conditions.

Water

Rainfall:

Inches of rainfall received for the months your crop was in the ground:
March_____

April_____

May_____

June_____

July_____

August _____

September _____

Total Rainfall _____ (inches)

Irrigation:
How was water applied? _____

Date of Irrigation	Hours per set	Head Size	Inches of water applied per acre

Total inches of water applied for season: _____

The Project

Soil Preparation:
How was the soil prepared? _____

_____

_____

_____

Planting:
Date of planting_____ Seeding rate (lb/acre)_____

Depth of planting _____ Row width _____

Did the seed receive any treatment? _____ if so, what type? _____

Seed variety _____

Where was seed obtained? _____

Rating of Bean Stand:
Excellent_____ Good_____ Medium_____ Poor_____

What were the reasons for this condition? _____

Growth Stages in Beans

Growth stage	Date	Comments
Germination		
First true leaves		
First bloom, any node		
Pod ½ in. long (on first bloom)		
Oldest pods with fully developed green seeds		
Leaves yellowing over half of plant. Oldest pods may be yellow		
Mature, 80% or more of pods showing yellow and mostly ripe		

Project Costs

(TRANSFER EACH TOTAL COST OR EXPENSE TO 4-H PROJECT RECORD BOOK PAGE 5
EQUIPMENT INVENTORY IS ON PAGE 6 OF THE 4-H PROJECT RECORD BOOK)

Seed Cost

Seeding rate _____(lb per acre)

multiplied by seed cost _____($ per lb)

multiplied by total acreage _____ (acres) equals

(1): TOTAL SEED COST _____

Machinery & Equipment Costs

Farming operation	Rate ($ per acre)	Member cost ($ per acre)	Landlord cost ($ per acre)	Total cost ($ per acre)
Total cost per acre				
(2) TOTAL MACHINERY and EQUIPMENT COST (total cost per acre X number of acres)				

Fertilizer Costs

Fertilizer nutrient(s)	Date	Method*	Rate (units per acre)	Member cost ($ per acre)	Landlord cost ($ per acre)	Total cost ($ per acre)
Fertilizer cost per acre $						
(3) TOTAL FERTILIZER COST (cost per acre X number of acres) $						

*Choose the letter representing the method of fertilizing from below:

(a) broadcast on surface; (b) side-dressed; (c) through irrigation system; (d) banded (near row); (e) preplant injection; (f) foliar; (g) other - please state

Chemical Costs

Chemical	Date	Rate (units per acre)	Reason for use	Member cost ($ per acre)	Landlord cost ($ per acre)	Total cost ($ per acre)
Chemical cost per acre $						
(4) TOTAL CHEMICAL COST (cost per acre X number of acres) $						

Labor Record and Costs

Each time you work on your project, make a record of it below.
Use one line for each kind of work. Make the record the day the work is done.
Your project should give a good return for your self-labor.

			Labor hours			**Costs per acre**		
Date	Kind of work	Acres	Self labor	Hired labor	Rate	Member	Landlord	Total
(5) TOTAL LABOR COST PER ACRE $								

Other Operating Costs

Include all other items for which cash was expended except seed, machinery and equipment, fertilizer, chemicals, and labor, which are reported in the preceding pages.

Item	Member cost per acre	Landlord cost per acre	Total cost per acre
Land charge, if cash rent is used*			
Water rent, if not included with land			
Consultant			
Storage			
Insurance			
Interest on borrowed money			
Miscellaneous (list)			
Total cost per acre $			
(6) TOTAL COSTS (cost per acre X number of acres)			

*Land charges include sprinkling system, depreciation and repair, water, and taxes.

Record of Yield and Crop Revenue for Member, Landlord, and Total

Date harvested	Yield (cwt/acre)	Revenue ($/cwt)	Member revenue ($/acre)	Landlord revenue ($/acre)	Total revenue ($/acre
(7) TOTAL REVENUE FROM BEANS (revenue per acre X acres) $					

Financial Summary

Transfer total costs to this page, not per acre costs.

Receipts

	Member	**Landlord**	**Total**
Total value of beans sold, And/or in storage (see (7), pg. 25) TOTAL RECEIPTS $'			

Costs

	Member	Landlord	Total
Seed (see **(1)** p. 22)			
Machinery and Equipment use (see **(2)** p. 22)			
Labor (see **(5)** p. 24)			
Fertilizer (see **(3)** p. 23)			
Chemicals (see **(4)** p. 23)			
Other operating costs (see **(6)** p. 25)			
Total Costs $			
Average cost per unit (cwt) (divide total expenses by yield)			
Average cost per acre (divide total expenses by total acres)			
PROFIT or LOSS $ (total receipts minus total costs)			

This profit (loss) figure represents your income for labor, management, and money invested.

Financial Performance Over Time; A History of Your Project

Transfer "Per Acre Costs" from previous years in the bean project.

Receipts per acre	**This Year** _____		**Last Year** _____		**2 Years ago** ___	
	Member	Landlord	Member	Landlord	Member	Landlord
(a) Total value of beans sold, and/or in storage ($)						
(b) Project size (acres)						
(c) Yield (cwt per acre)						
Costs per acre ($)	**This Year**_____		**Last Year** _____		**2 Years ago** ____	
	Member	Landlord	Member	Landlord	Member	Landlord
Seed						
Equipment use						
Labor						
Fertilizer						
Chemicals						
Other operating costs						
(d) Total costs ($)						
Avg. cost per unit (cwt) (d)/(c)						
Avg. cost per acre (d)/(b)						
PROFIT OR LOSS (a)-(d)						

Average Values per Acre, Years _____thru _____ (Determine the average values per acre by adding the total costs or receipts per acre in each row in the table above and divide by the number of years in your project.)

Avg. costs per acre ($)	**Member**	**Landlord**
Seed		
Equipment use		
Labor		
Fertilizer		
Chemicals		
Other operating costs		
(e) Total costs ($)		
(f) Avg. revenue from (a) above		
(g) Avg. project size		
(h) Avg. yield		
Average cost per unit (cwt) (e) / (h)		
Average cost per acre (e) / (g)		
PROFIT OR LOSS (f) - (e)		

THE ORAL PRESENTATION
COUNTY BEAN FIELD TOUR

The oral presentation is intended to provide you with an opportunity to learn more about your project and to share your ideas and experiences with others. Your oral presentation will be evaluated as follows:

Organization and Content	**Points Possible**	**Your Score**
Opening comments	5	
Background Information (field history and site information)	10	
Knowledge and understanding of practices used (below) Variety Seed treatments Fertilization Planting information Pest control Cultivation practices Seedbed preparation Irrigation scheduling	15	
Presentation Posture Friendliness Pronunciation Ease and confident manner Distinct speech Handling of Questions	20	
General Appearance of Field borders Plant population Weed control Insect damage Disease control Appearance of plants	30	
Personal Involvement	20	
100 TOTAL POINTS POSSIBLE	**Your Final Score**	

Judged by: _____:

Date_____

PARENTS ARE ENCOURAGED TO ATTEND FIELD TOUR!

Your Workbook Score

Workbook will be graded under supervision of an extension educator at end of project year.

Points Possible	Your Score	
Completeness 1. All blanks properly filled	30	
Accuracy 1. Dates and accounts are correct. 2. Record appears logical. 3. Record is kept throughout the year and essential information is entered at proper time.	30	
Results - Story - Questions 1. Record shows good management, development, and care of project. 2. Proper language is used. 3. Record shows that experience was gained and that approved practices were followed	30	
4. Questions are answered properly.		
Neatness 1. Writing is legible (pen or pencil) 2. Book is reasonably clean	10	
3. Record shows signs of use.		
TOTAL	**100**	

Graded by: _____ Date: _____

Your County Fair Exhibit Points

	Points Possible	Your Score
Best of Class	5	
Blue Ribbon	20	
Red Ribbon	15	
White Ribbon	5	
Exhibit at Fair	25	
TOTAL	**50**	

Signed by Club Leader; _____ Date: _____