

# The Field Bean Seed Bean Production Guide



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## 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 to be used 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.

## 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

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.

Every record book 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 less than 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 southcentral 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 obtain samples of the different market classes of beans grown in their community or county. Great Northern beans are medium-sized white beans. Pintos are similar to Great Northern beans 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 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, sugarbeets, 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 sugarbeets.

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 also to reduce any possible hazard to the following crop of beans.

If large quantities of crop residue have been incorporated into the soil prior to 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, fairly 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 prior to 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 fertility left by the other crops. 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. Pre-plant irrigation and the following tillage kill more weeds. After planting, beans may be harrowed with a finger weeder or other flexline harrow, if necessary, to control seedling weeds. When the beans have emerged in obvious rows, cultivation with conventional down-the-row cultivators 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 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. Usually, it is necessary to cultivate after each irrigation until just before row closure, or layby.

After layby, 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 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

to 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. Your 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 fall 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

- Arrange for a committee on transportation. 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.

## Record Books

A completed record book must be exhibited with bean project exhibits (use #91901). The record book should contain a story about your bean project telling of any problems, how they were solved, what you learned, and any other interesting information.

Check the record book carefully. Be sure it is complete, including the necessary signatures.



The  
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University of Idaho  
Extension

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