

Survey of Dry Bean Farmers in Washington

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Summary

In 2002, we surveyed dry bean farmers in Washington to better understand farmers' perceptions regarding dry bean production, storage and marketing in the region. We developed a short questionnaire and distributed it to 124 farmers by mail and conducted a follow up through email (30) and telephone interviews (88). Forty-six farmers from 18 counties in Washington responded to our survey. Telephone interviews was the most successful method of obtaining survey responses (65% response). Seventeen (37%) respondents were located in eastern Washington and 29 (63%) were in western Washington. Eleven of the respondents in eastern Washington were in the Columbia Basin, and nine of these 11 were large-scale farmers who grew dry beans on 18-450 acres each, and 155 acres on average. In contrast, 37 farmers were small-scale farmers each with a total dry bean production area of a minimum of 10-row feet and a maximum of 1.25 acres, and 0.13 acre on average. All the large-scale farmer respondents were men and half (57%) of the small-scale farmer respondents were women. These results imply that women actively participate in small-scale dry bean farming and do not participate in large-scale farming.

The 46 farmer respondents grew 69 different varieties of dry beans over the past 1 to 30 years. Large-scale respondents grew on average 2 varieties of dry beans each year and primarily grew pinto, red kidney and small red types. Small-scale respondents grew 1-20 varieties of dry beans each year, 4 varieties on average per respondent, and Jacob's Cattle, Black Turtle, Cannellini, Calypso and Cranberry were some of the main varieties that they grew. 46% of the respondents saved seed from their bean crop, 63% stored dry bean seed on the farm for up to six years, and respondents reported they had no serious problems with seed production or seed saving. Common on-farm storage containers used were glass jars, sacks, plastic tubs or buckets, or wooden boxes. None of the large-scale farmers saved bean seed from their crop and over half (56%) of the small-scale farmers saved seed.

Regardless of the scale of production, most of the respondents (31 or 67%) did not observe any disease problems in their dry bean crop and felt they had healthy crops in the past. The remaining 15 farmers observed disease symptoms such as mold, seedling wilt, brown leaf spot, pod rot and anthracnose. Symptoms of Beet Curly Top Virus and Bean Yellow Mosaic Virus were observed by 4 farmers. Most of the small-scale respondents were organic growers and did not use any chemical pest control measures. Respondents rated weeds as the number one problem in dry bean production (26%), followed by poor germination (22%), late maturity (20%), diseases (20%) and shriveled beans (13%). There was no correlation between saving seed and poor seed germination. Some respondents also reported that inadequate tools for small-scale dry bean threshing was a major constraint to increasing dry bean production.

This survey did not adequately capture the large-scale dry bean producers in the state, however results indicate that small-scale farmers are currently growing dry beans in Washington and most of these small-scale farmers are located in western Washington. Because of the relative ease of production and storage of dry beans and their long marketing window, dry beans have the potential to become an important crop for many small farmers in the Pacific Northwest and elsewhere in the United States. By orienting our research program to address production issues of small-scale farmers in Washington, we could assist small-scale farmers throughout the United States to increase their production, marketing and consumption of dry beans.

Introduction

Dry beans are generally considered a large-scale commodity crop in the United States, yet they are also well suited to small-scale production for niche markets. Dry beans are harvested in the fall, easily stored over the winter, and can be a good addition for direct market farmers who need additional crops at the beginning and end of the growing season. The Pacific Northwest has relatively cool summer temperatures that result in a low number of growing degree days that pose a challenge for farmers (Table 1). Due to lower growing degree days in the Pacific Northwest, most dry bean varieties are harvested 15 or more days later than in the mid-West (Miles and Sonde 2002). To better understand farmers' perceptions regarding dry bean production, storage and marketing in the region, we conducted a survey of dry bean farmers in Washington state. We will use the survey information to target our field research program to address the issues that farmers feel are most important. This paper presents results of our survey of dry bean farmers in Washington.

Table 1. Average monthly growing degree days (GDD) at base temperature 50⁰ F during the growing season in some towns in Washington (Western Regional Climate Center 2003).

| Location | Average Monthly Growing Degree Days* | | | | | | Total |
|---------------|--------------------------------------|------|------|--------|-------|------|-------|
| | May | June | July | August | Sept. | Oct. | |
| Ellensburg | 192 | 363 | 572 | 537 | 272 | 53 | 1989 |
| Ephrata | 322 | 536 | 776 | 732 | 444 | 112 | 2922 |
| Kennewick | 365 | 564 | 776 | 734 | 449 | 139 | 3027 |
| Leavenworth | 220 | 388 | 592 | 580 | 320 | 59 | 2161 |
| Mt. Vernon | 1401 | 258 | 367 | 380 | 234 | 70 | 1449 |
| Olympia | 134 | 263 | 407 | 409 | 254 | 65 | 1532 |
| Othello | 252 | 436 | 655 | 618 | 361 | 94 | 2416 |
| Port Townsend | 144 | 251 | 364 | 376 | 262 | 81 | 1478 |
| Prosser | 279 | 453 | 646 | 612 | 369 | 110 | 2469 |
| Quincy | 288 | 470 | 685 | 646 | 386 | 89 | 2564 |
| Vancouver | 210 | 346 | 503 | 502 | 347 | 136 | 2044 |
| Yakima | 244 | 430 | 628 | 585 | 333 | 70 | 2290 |

* Data is an average from 1948 to 2003

Objectives

The survey was originally planned with the following broad objectives to be conducted over a three-year period as part of a student Ph.D. program.

- Determine the number of small-scale farmers involved in dry bean production.
- Determine the number of women small-scale farmers involved in dry bean production.
- Identify the types and varieties of dry beans that are most commonly grown in the region.
- Determine the acreage in dry bean production in the region.
- Identify bean pest problems observed by farmers.
- Determine on-farm seed storage methods most commonly used in the region.
- Identify production issues that should be addressed in the region.

Unfortunately, the Ph. D. student engaged to implement the plan of work left the project after 5 weeks. Therefore the project was trimmed drastically to a four-month sample survey whereby we contacted approximately 10% of the dry bean farmers across the state to lay a foundation for more detailed work in the future.

Materials and Methods

A simple survey format was developed with 13 questions pertaining to dry bean production, storage and marketing. Initially we planned to visit farmers at their farms to conduct individual interviews and to collect data. After our student left, we decided to adopt other methods of communication in view of time and fiscal constraints. We distributed our questionnaire to 124 farmers by mail and conducted a follow up through email (30 farmers) and telephone interviews (88 farmers).

For our survey, we attempted to reach growers in the Columbia Basin region of eastern Washington, which is the main dry bean production region in Washington due to its favorable dry summer weather and low costs of land and irrigation. Main counties in eastern Washington where dry beans are grown on a large scale are Grant, Franklin, Adams, Benton, Kittitas, Walla Walla and Yakima (Schreiber and Ritchie, 1995). In addition, we identified small-scale farmers throughout the state who grew dry beans for local markets and for their own consumption. To obtain names of dry bean farmers for our survey purposes, we contacted extension personnel in the all counties throughout the state. We utilized the Washington Tilth directory and a list of organic growers to locate organic dry bean farmers in the state. We contacted farmers market managers throughout the state and requested names of farmers who were selling dry beans in the markets. In addition, we asked responding farmers for the names and contact phone numbers of their neighbors, friends or others they knew growing dry beans. We contacted each farmer by one or two of the above communication methods.

Results and Discussion

In total we attempted to contact 124 dry bean farmers. Mailed questionnaires were sent to all 124 farmers; 28 farmers responded (23%) but only 16 of them (54%) grew dry beans (Table 2). As a follow-up, 30 farmers were contacted through emails, and 88 were contacted by telephone. We received five email replies (17%), but only three of these

respondents grew dry beans. We interviewed 31 (35%) farmers by telephone. Telephone interviews were found to be the most successful communication method because we made repeated calls to contact a person and conducted the interview at his or her convenience.

Efforts to obtain names of dry bean farmers through county extension agents were not successful as most extension agents did not know the names of dry bean farmers in their area. Although we attempted to contact as many dry bean farmers as possible across the state, we were only successful in contacting 46 farmers. The main reasons for this low contact level were:

1. There is no central list or contact point for dry bean farmers in Washington.
2. Farmers were no longer living at listed or given addresses.
3. Farmers' listed telephone numbers had changed and no forwarding number was given.
4. Only answering machines could be reached, and despite repeated attempts our phone calls were not returned
5. No responses were forthcoming to mailed questionnaires.

Table 2. Number of farmers contacted via mailed questionnaires, emailed questionnaires and telephone interviews, and numbers who responded.

| Contact Method | No. farmers contacted | No. farmers responded | % farmers responded | No. bean farmers | % bean farmers |
|------------------------|-----------------------|-----------------------|---------------------|------------------|----------------|
| Mailed Questionnaires | 124 | 28 | 22.6 | 12 | 9.7 |
| Emailed Questionnaires | 30 | 5 | 16.6 | 2 | 6.6 |
| Telephone Interviews | 88 | 57 | 64.7 | 31 | 35.2 |

Geographic and Gender Distribution. Forty six farmers in 18 counties in Washington responded to our dry bean survey (Table 3). Of the 46 respondents, 54% were from the northwest region (25 farmers), 24% were from the eastern region (11 farmers), 9% were from the southwest (4 farmers), 6.5% (3 farmers) were from the north central and 6.5% (3 farmers) were from the south central regions. According to the Washington Crop Statistics, US Census of Agriculture in 1997, there were 315 large-scale dry bean farmers in Washington state. Our survey only captured 9 (3%) of these large-scale farmers.

Of the respondents, 21 were female (46%). In some cases both husband and wife farmed together and they consulted each other while answering the telephone interview. In these cases, the gender of the primary person responding to the interview was counted. In all regions except the East, more than half of the farmer respondents were women (Figure 1). All women farmer respondents were small-scale direct market farmers. All 11 respondents from the eastern region were male, and nine (82%) were large-scale farmers who produced beans on contract or for wholesale. It is interesting to note that dry bean farming in the eastern region was large-scale and this type of farming was conducted by

men whereas dry bean farming in the western region was small-scale and 60% of these farmers were women. These results imply that women farmers actively participate in small-scale farming and do not participate in large-scale farming.

Table 3. County and gender (M=male, F=female) distribution of respondents in northwest (NW), southwest (SW), north central (NC), south central (SC) and the east (E) regions in Washington.

| NW Counties | No. | | SW County | No. | | NC Counties | No. | | SC Counties | No. | | E Counties | No. | |
|------------------|-----------|-----------|--------------|----------|----------|----------------|----------|----------|----------------|----------|----------|---------------|-----------|----------|
| | M | F | | M | F | | M | F | | M | F | | M | F |
| Island | 1 | 4 | Thurston | 1 | 3 | Douglas | 0 | 1 | Benton | 1 | 1 | Grant | 7 | 0 |
| Jefferson | 2 | 2 | | | | Chelan | 1 | 1 | Kittitas | 0 | 1 | Stevens | 2 | 0 |
| Pierce | 0 | 1 | | | | | | | | | | Franklin | 1 | 0 |
| King | 1 | 2 | | | | | | | | | | Whitman | 1 | 0 |
| Skagit | 3 | 3 | | | | | | | | | | | | |
| Grays Harbor | 1 | 1 | | | | | | | | | | | | |
| Kitsap | 0 | 1 | | | | | | | | | | | | |
| San Juan | 2 | 1 | | | | | | | | | | | | |
| Snohomish | 1 | 0 | | | | | | | | | | | | |
| Total M F | 11 | 14 | | 1 | 3 | | 1 | 2 | | 1 | 2 | | 11 | 0 |
| Total | 25 | | | 4 | | | 3 | | | 3 | | | 11 | |

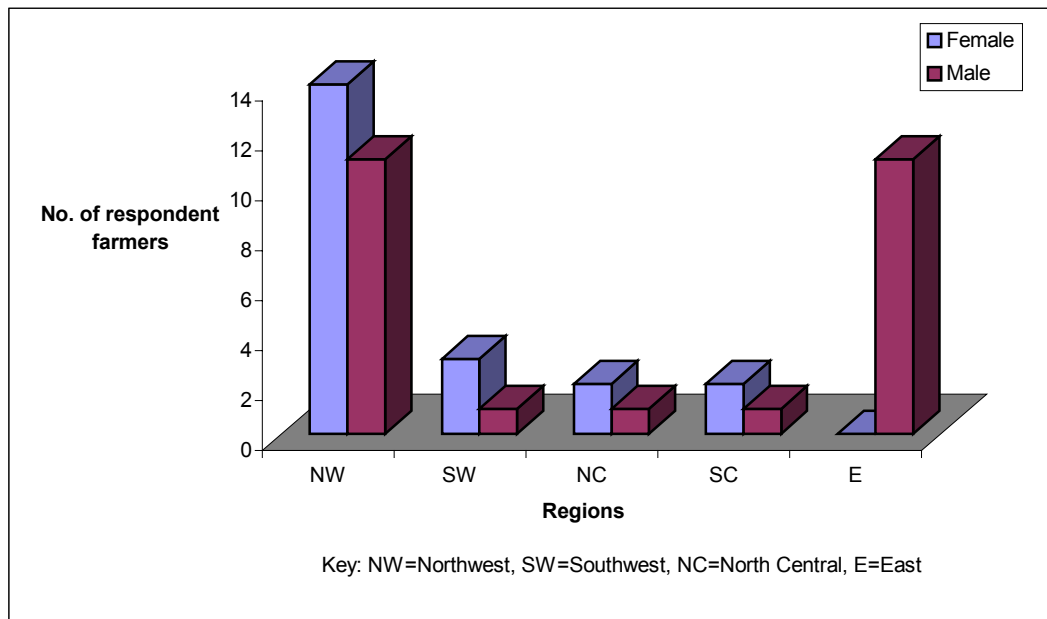


Figure 1. Gender distribution of respondent dry bean farmers by region in Washington.

Number of years in dry bean production. Respondents had grown dry beans for 1 to 30 years, and in the eastern region the range was 5 to 20 years whereas in the northwest region the range was 1 to 5 years (Figure 2). Respondents from the southwest, south central and north central regions had grown dry beans for 3 to 26 years. Some

respondents grew dry beans in alternate years due to crop rotation patterns, low market price, non-suitability of weather, high labor costs, and difficulty in threshing.

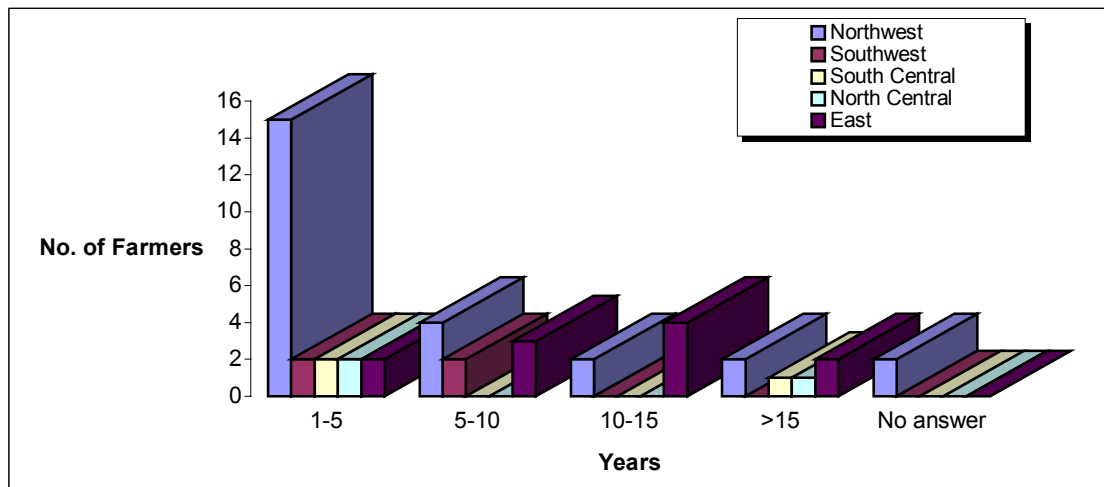


Figure 2. Number of respondent farmers in five regions of Washington who have been growing dry beans for 1–5, 5–10, 10–15 and greater than 15 years.

Dry bean varieties grown. The 46 respondent farmers grew a total of 69 different varieties of dry beans in the past 1 to 30 years. Some farmers carried out their own dry bean varietal evaluations and grew multiple varieties each year. Nine (20%) of the respondents, all from the eastern region, were large-scale farmers who grew dry beans on 18-450 acres each, and 155 acres on average. The primary types of beans grown by these large-scale farmers were pinto, red kidney and small red. All other respondents (80%) were small-scale farmers, each with a total dry bean production area of a minimum of 10-row feet and a maximum of 1.25 acres, and 0.13 acre on average. The main varieties grown by these farmers were Jacob’s Cattle and Black Turtle followed by Cannellini, Calypso, and Cranberry.

Diseases of dry beans observed. Most of the respondents (31, or 67%) did not observe any disease problems in their dry bean crop and have had healthy crops in the past (Table 4). The remaining 15 farmers (33%) did observe disease symptoms, the most common of which were mold followed by seedling wilt, brown leaf spots, pod rot and anthracnose. Symptoms of Beet Curly Top Virus and Bean Yellow Mosaic Virus were observed by 4 farmers. Some respondents observed more than one disease symptom in their crop. Only three respondents used chemical treatments to control diseases, and these respondents used either Dimethoate to control aphids, the vector of curly top, or a fungicide to control white mold (Table 4).

Table 4. Disease symptoms in dry beans observed by respondent farmers.

| Disease Symptoms Observed | No. of Farmers | Percentage of farmers |
|----------------------------------|-----------------------|------------------------------|
| No symptoms observed | 31 | 67.4 |
| Yellowing (Virus) | 2 | 4.3 |
| Curling (Virus) | 2 | 4.3 |
| Mold | 6 | 13.0 |
| Anthracnose | 1 | 2.2 |
| Brown Spot | 2 | 4.3 |
| Pod Rot | 2 | 4.3 |
| Seedling Wilt | 2 | 4.3 |

Bean storage. Twenty-nine (63%) of the respondents stored beans on their farms and 17 (37%) did not. All of the farmers who stored beans were small-scale. All of the large-scale farmers and eight small-scale farmers did not store beans on their farms.

Seed saving. Twenty-one (46%) respondents saved seed from their bean crop on their farms, and 25 (54%) did not. Of the respondents who did not save seed, nine (19.6%) were large-scale farmers who grew dry beans on contract; new seed was supplied each year by the contract companies, and every year these farmers transported their harvested beans back to the company for storage and marketing. The remaining 16 farmers who did not save seed sold the beans they produced, distributed them among friends and neighbors, or consumed the beans on the farm.

Bean and Seed Storage. The storage techniques that respondent farmers used for seed were the same as the storage techniques they used for beans. Of the respondents who saved seed/beans, four stored them in the pod and all others stored them as cleaned seed/grain. Only three respondents who stored seed/beans observed any problems (mold) while 91% of the respondents who stored seed/beans did not observe any serious problems. Storing seed/beans in glass jars was the most popular storage method and was used by 10 of the respondents (36%) (Table 5). Other popular storage methods were plastic bags or gunnysacks, boxes and tins, paper bags and plastic buckets/containers.

Table 5. On-farm dry bean seed/bean storage methods; some farmers practiced two or more storage methods.

| Storage Method | Number of farmers | % farmers^y | % farmers^z who stored seeds |
|------------------------------------|--------------------------|------------------------------|---|
| Glass jars | 10 | 21.7 | 35.7 |
| Gunnysacks/plastic sacks | 6 | 13.0 | 21.4 |
| Plastic bucket/container | 6 | 13.0 | 21.4 |
| Hanging pods | 2 | 4.3 | 7.1 |
| Pods in garbage sacks | 2 | 4.3 | 7.1 |
| Glass jars and paper bags | 2 | 4.3 | 7.1 |
| Paper bags | 2 | 4.3 | 7.1 |
| Gunnysacks and tins | 1 | 2.2 | 3.6 |
| Glass jars and plastic bags | 1 | 2.2 | 3.6 |
| Wooden box | 1 | 2.2 | 3.6 |

| | | | |
|--------------------------------|---|------|-----|
| Onion sacks and buckets | 1 | 2.2 | 3.6 |
| Took beans to company | 9 | 13.0 | -- |
| Consumed/Sold | 6 | 13.0 | -- |

^y Calculated as a % of the total number of respondent farmers = 46

^z Calculated as a % of the number of respondent farmers who stored beans = 34

Duration of seed storage. In order to know whether farmers saved seeds for several years and planted only a portion each year, respondents were asked to state how long they stored their bean seeds before they bought or produced new seeds. Twenty-five (54%) of the respondents did not store seed (Table 6). Of these respondents, 16 (35%) stated they sold or consumed all the beans they produced and nine transported their entire bean crop to the seed companies as per their contract agreements. Of the respondents who stored seed sixteen (35%) stored seed for 1-3 years, and five (11%) stored seed for 3 - 6 years.

Table 6. Duration of on-farm storage of dry bean seed.

| Duration of storage | No. farmers | % farmers |
|--|--------------------|------------------|
| No storage - sold/consumed all beans | 16 | 35 |
| None - transported beans to warehouse | 9 | 20 |
| 1 year | 10 | 22 |
| 1 to 3 years | 6 | 13 |
| 3 to 6 years | 4 | 9 |
| More than 6 years | 1 | 2 |

Buying new seed. Respondents were asked how often they bought new seed, and Table 7 is a summary of those responses. Of the respondents, 20 (43%) bought new seeds every year, 8 (17%) bought new seeds every 2-5 years, and 12 (26%) only purchased new seeds if they produced insufficient supplies on their farm. Of the respondents who purchased new seed every year, nine were large-scale contract farmers who received new seed every year from their contracting companies. Eleven respondents indicated they almost never bought new seeds as they produced sufficient amounts from their own bean crop.

Table 7. Frequency that respondents purchased new dry bean seed.

| Frequency | No. farmers | % farmers |
|--------------------------------|--------------------|------------------|
| Stopped growing beans | 3 | 6 |
| Yearly | 11 | 24 |
| Yearly (Company supply) | 9 | 20 |
| 2-3 years | 5 | 11 |
| 4-5 years | 3 | 6 |
| When own seed fails | 1 | 2 |
| Keep own seeds | 11 | 24 |
| Don't know | 3 | 6 |
| No response | 1 | 2 |

Seed Sources. Half of the respondents indicated they obtained dry bean seed through more than one source. Nineteen (41%) of the respondents saved seed from their own bean crop and an equal number purchased their seed either through mail order or seed catalogues (Table 8). Thirteen respondents saved their own seed and also ordered seed through seed catalogues. Points of purchase for bean seed included seed catalogues, farm stores, grocery stores, health food stores, and contracting companies. Five respondents indicated they traded or bartered seed locally or through Seed Savers Exchange. One respondent was a bean seed grower who multiplied Certified Seed.

Table 8. Sources of dry bean seeds.

| Seed Source | <u>No. farmers</u> | <u>% farmers</u> |
|--------------------------------|---------------------------|-------------------------|
| Seed catalog | 19 | 41 |
| Own seed | 19 | 41 |
| Own seed + Seed catalog | 13 | 28 |
| Farm/Seed store | 9 | 20 |
| Contracting companies | 6 | 13 |
| Trade/Barter | 4 | 9 |
| Grocery store | 1 | 2 |
| Health food store | 1 | 2 |
| Seed Savers Exchange | 1 | 2 |
| Foundation to certified | 1 | 2 |

Seed treatment prior to planting. When questioned about seed treatments used prior to planting, 25 respondents (54%) did not apply any treatment and four received their seed already treated from their contracting companies (Table 9). Seventeen respondents applied seed treatments to their dry beans prior to planting, but only three of these farmers applied pesticide seed treatments. Fungicide and insecticide seed treatments were used by only 15% of the respondents. Other seed treatments that were applied prior to planting included *Rhizobium* inoculum and water soaking overnight or for a few hours.

Table 9. Seed treatments applied to dry beans prior to planting.

| Treatment | <u>No. farmers</u> | <u>% farmers</u> |
|------------------------------------|---------------------------|-------------------------|
| No treatment | 25 | 54 |
| <i>Rhizobium</i> Inoculum | 8 | 17 |
| Overnight soaking | 5 | 11 |
| Received treated seed | 4 | 9 |
| Fungicide/insecticide | 3 | 6 |
| Soaking for couple of hours | 1 | 2 |

Seed treatment prior to storage. None of the respondents used any chemical or biological seed treatments prior to seed storage, however one farmer indicated she stored her seed in a jar with bay leaves. This farmer placed a layer of bay leaves at the bottom of a glass jar, filled the jar with beans, placed another layer of bay leaves on top, and closed the jar. It was not clear what the purpose of the bay leaves was in seed storage. Almost half of the respondents (20, or 44%) indicated that the only treatment they used prior to

storage was adequate bean seed drying (Table 10). Methods of drying varied according to climate and convenience. The most common drying method was sun drying while other methods included drying by the fireplace, in a barn, on racks, and in the house.

Table 10. Methods of drying used prior to dry bean seed storage.

| Treatment | <u>No. farmers</u> | <u>% farmers</u> |
|------------------------------|---------------------------|-------------------------|
| No treatment | 26 | 56 |
| Sun drying | 6 | 13 |
| Drying in barn | 2 | 4 |
| Drying on paper in house | 1 | 2 |
| Drying by fireplace | 1 | 2 |
| Drying in pods | 1 | 2 |
| Screen drying under ceiling | 1 | 2 |
| Drying on racks | 1 | 2 |
| Bay leaves on top and bottom | 1 | 2 |

Dry bean production problems. Respondents were asked to check off all problems they faced during dry bean production. A great majority of respondents (37, or 80%) checked one or more problems associated with dry bean production and 9 respondents (20%) reported no problems (Table 11). Of the problems that were observed, weeds were rated number one, followed by poor germination, late maturity, diseases, and shriveled beans at harvest. There was no correlation between poor germination and seed saving. That is, poor germination was noted by farmers who purchased new seed every year and was not noted by farmers who saved their own seed. Poor stand and poor pod set were considered minor problems. Among diseases, mold and mildew were reported as the main problems. Some respondents reported that difficulty in threshing, different maturity times, slugs, deer and mice were also problems in dry bean production.

Table 11. Dry bean production problems noted by respondents.

| Problems | <u>Number Farmers</u> | <u>% Farmers</u> |
|--------------------------|------------------------------|-------------------------|
| Weeds | 12 | 26 |
| Poor germination | 10 | 22 |
| Late maturity | 9 | 20 |
| Diseases | 9 | 20 |
| No problems | 9 | 20 |
| Shriveled beans | 6 | 13 |
| Poor crop stand | 5 | 11 |
| Poor pod set | 4 | 9 |
| Low yield | 4 | 9 |
| Poor flowering | 2 | 4 |
| Different maturity times | 1 | 2 |
| Difficult threshing | 1 | 2 |
| Deer | 1 | 2 |
| Mice | 1 | 2 |
| Slugs | 1 | 2 |

Dry bean marketing. Respondents were asked how they market their dry beans, and 23 farmers (50%) stated they kept their dry beans for their own use and did not sell them (Table 12). Three farmers (7%) shared their beans with their friends and neighbors instead of marketing. Nine farmers (20%) were large-scale contract growers and delivered their beans to the contract company, which in turn marketed the beans. Only 14 farmers (30%) marketed their own crop; the majority of these farmers sold directly to consumers, and most of them sold their beans through more than one marketing channel. Farmers' markets was the most popular direct marketing channel for farmers in this survey, while other direct marketing channels included on-farm sales, community supported agriculture subscriptions, and sales to restaurants. Only two farmers sold their beans to either a retailer or a cooperative.

Table 12. Methods of dry bean marketing.

| Methods of Marketing/Usage | No. farmers | % farmers |
|--|--------------------|------------------|
| Own use | 23 | 50 |
| Farmers' market | 12 | 26 |
| Whole sale/company | 9 | 20 |
| Sell at farm | 5 | 11 |
| Sharing | 3 | 7 |
| Community Supported Agriculture | 3 | 7 |
| Restaurant | 2 | 4 |
| Road side stand | 1 | 2 |
| Sell to retailer | 1 | 2 |
| Sell to a Particular person | 1 | 2 |
| Co-operatives | 1 | 2 |

Conclusions

Through this survey we identified 37 small-scale dry bean farmers located throughout Washington, and we believe that these are the majority of small-scale farmers who are actively growing and marketing dry beans in the state. Therefore we believe that the results of this study reflect the situation of small-scale dry bean production in Washington and give us a good preliminary understanding of small-scale production and marketing issues in the state. This survey did not capture large-scale dry bean production and marketing in Washington. The major constraint to reaching dry bean farmers in Washington is in identifying who they are. There is no single location for names and addresses for dry bean farmers in Washington, and even the state organic directories which listed small-scale farmers were inaccurate. Dry bean contracting companies and the Washington Crop Improvement Association could be tapped to obtain names and contact information for dry bean farmers, but this information is considered proprietary.

Telephone surveys were the most effective method of obtaining survey responses and this method was also relatively cost effective. To clarify response information and to strengthen the data, a follow-up interview should be conducted after the preliminary

responses have been compiled. To more fully understand dry bean production and marketing in the state, farm visits should be made to several farms in each region.

We found that dry beans are produced on a small-scale in every region of the state whereas large-scale production only occurs in Eastern Washington (Columbia Basin). Half of the small-scale farmers who responded to this survey were women farmers. None of the large-scale farmers who responded to this survey were women farmers. Based on this result, our observations at grower field days and grower meetings, and observations made by other extension faculty and agency representatives, it appears that women farmers are very active in small-scale farming but are not at all active in large-scale farming.

The scale of production of dry beans for small-scale farmers was quite small, with farmers growing dry beans on an area of up to 1 ¼ acres. The diversity of dry beans grown by small-scale farmers was quite large, and respondents reported growing a total of 69 varieties. Jacob's Cattle, Black Turtle, Cannellini, Calypso, Black, and Cranberry were some of the main varieties grown by small-scale farmers. Dry beans appear to be a fairly new crop to farmers in northwest Washington as all respondents in that region indicated they had been growing dry beans for only 1–5 years. In the rest of the state, respondents had been growing dry beans for 5–20 years. A few of the respondents in western Washington began growing dry beans as a result of information they received from our program.

Two-thirds (63%) of the respondents saved beans on their farm. None of the large-scale farmers saved beans and three-quarters (78%) of the small-scale farmers saved beans on their farms. Twenty-one respondents saved seed from their bean crop, and 11 of these farmers also bought new seed as needed. Twenty-five respondents did not store any seed and bought new seed each year from stores, catalogues or contract companies. More than half the small-scale farmer respondents saved seed and none of the large-scale farmer respondents saved seed. All of the large-scale farmer respondents and a quarter of the small-scale farmer respondents bought new seed each year. A quarter of the small-scale farmer respondents bought new seeds every 2-5 years, and a third only purchased new seeds if they produced insufficient supplies on their farm. Respondents reported they had no serious problems with seed production or seed saving. Common on-farm seed/bean storage containers used were glass jars, sacks, plastic tubs or buckets, or wooden boxes. There were no serious problems with storage except a few respondents who reported mold when they stored their beans in the pod. Mold was likely caused by insufficient drying of dry beans and these farmers would benefit from changing their drying technique.

Farmers who responded to this survey indicated they had very few disease problems in the field. The main disease problems reported were yellowing, curling, mold, anthracnose, brown spots, pod rot and seedling wilt. However, our experience of growing dry beans at the Washington State University Vancouver Research and Extension Unit has indicated to us that several diseases may be prevalent in dry beans grown in western Washington. The major disease pressures we found were due to Halo Blight

(*Pseudomonas syringae*) and viruses. It may be that farmers were unfamiliar with symptoms of these diseases and so did not recognize that their bean crop was affected by disease. In our studies, it appeared that at least Halo Blight was introduced into the field through the seed of certain varieties. We have initiated a greenhouse experiment to determine if we can produce Halo Blight-free seed from Halo Blight-infected seed during the off-season. In the field we have initiated an experiment to determine if we can control soil/debris-borne Halo Blight with winter planted cover crops.

According to the respondents, the main dry bean production problems that need to be addressed are weed and disease control, poor germination, late maturity, poor flowering, and threshing for small-scale farmers. Due to cool summer growing weather, dry beans tend to mature 15 days later in Western Washington as compared to the mid-West United States. In our variety trials in Vancouver, we have identified over 50 dry bean varieties that will mature in our region. We have made this information available to farmers through field days, grower meetings and our web site. In 2003, we are continuing our variety trials and will expand to on-farm trial sites in western Washington. On-farm trials will further demonstrate the suitability of varieties for the region, will help us identify more specifically any production problems in the region, and will raise the awareness of farmers for the potential of dry bean production in their area.

The majority of respondents (85%) did not apply any pesticide treatments prior to planting dry beans, and no respondents applied any pesticide treatments for dry bean storage. Only 17% of the respondents applied *Rhizobium* inoculum prior to planting dry beans. These results imply that small-scale farmers could benefit from learning more about seed treatments and field fertility management practices, and this information could result in improved dry bean performance and yield.

More than half the small-scale farmers (62%) grew dry beans for their home consumption and did not market their dry beans. 30% of the small-scale farmers direct marketed their crop, and most farmers sold their beans through more than one marketing channel. Farmers markets was the most popular direct marketing channel for farmers in this survey, while other direct marketing channels included on-farm sales, community supported agriculture subscriptions, and sales to restaurants. Each year farmers who sold their beans sold all the beans they produced, indicating there may be a potential to increase the area under niche-market dry bean production in the region.

Respondents indicated that they felt small-scale dry bean production was labor intensive especially in Western Washington where field drying is a major production constraint. There are also perceived high labor costs due to inadequate threshing equipment for small-scale dry bean farmers. Some respondents had discontinued growing dry beans after 1–2 years but indicated they would like to grow them again under increased area if they had a better understanding of market prices and the production recommendations for Western Washington. To expand small-scale dry bean production in Washington, and likely elsewhere in the United States, suitable and affordable production, harvesting, drying and threshing technologies need to be developed and made available to small-scale farmers.

All survey respondents agreed that dry beans are a relatively easy crop to produce and store. The long marketing window for dry beans is also extremely advantageous to diversified small farms. Per capita consumption of dry beans has increased in the United States from 5.1 pounds per person in 1984 to 8.1 pounds per person in 1999, a 58% increase (Belshe *et al.* 2001). Consumers are also becoming more aware of the nutritional value and positive health effects of eating dry beans. Therefore we feel that dry beans have the potential to become an important crop for many small farmers in the Pacific Northwest and elsewhere in the United States. By orienting our research program to address production issues of small-scale farmers in Washington, we could assist small-scale farmers throughout the United States to increase their production, marketing and consumption of dry beans.

The Bean/Cowpea CRSP program at Washington State University Vancouver Research and Extension Unit has initiated efforts to address some of these issues. We have conducted dry bean variety trials in 2001 and 2002 to screen for early-maturing, high yielding, disease resistant/tolerant dry bean varieties that we can especially recommend to farmers in the western region of the state. Based on our variety trial results, we have characterized dry bean varieties with a particular emphasis on varieties that are more suitable for niche markets. We have experimented with solar drying and small-scale dry bean threshing and cleaning equipment. We have developed a consumer brochure that promotes the health benefits of dry beans. We have presented our variety trial results at grower meetings in Western and Eastern Washington, and we have presented the health benefit information of dry beans to consumer groups such as county diabetic focus groups, master gardeners, and the primary school extension education program (EFNEP). We have sent our reports to the major seed companies throughout the United States who supply dry bean seed to small farmers. Finally, we have posted all our information on the web at <http://SustainableSeedSystems.wsu.edu> for public access.

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