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M. LeRon Robbins
Iowa State University

Kermit J. Hildahl
Iowa State University

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Feasibility of Commercial Vegetable Production in Western Iowa as a Boost to Agricultural and Rural Development

M. LeRON ROBBINS and KERMIT J. HILDAHL¹

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SYNOPSIS: Yield and quality of several kinds of vegetables grown on plots in Iowa's Missouri River Valley were high, indicating great potential for commercial production of high-value crops. The

availability of water; the light, fertile soils present in parts of the Valley; and the reasonably long growing season make the Valley potentially an even greater food-producing area than it is presently. Commercial vegetable production in the Valley could be expected to increase farm income, stimulate the economy of local small towns, and reduce the migration of rural people to urban areas.

The Missouri River Valley and valleys of adjacent tributaries in Iowa consist of thousands of acres of agricultural land potentially suited for vegetable production. There is ample water for irrigation at depths of 100 feet or less. Major crops in the area presently are corn and soybeans, but because of the availability of irrigation water and suitable soils, higher-value crops offer potential for the area.

Residents of the Valley have expressed interest in high-value crops as a means of increasing farm income, stimulating the economy of local small towns, and reducing migration to urban areas. The board of directors of the Iowa State University (I.S.U.) Western Iowa Experimental Farm in 1971 requested I.S.U. to determine the feasibility of the production of high-value crops in the Missouri River Valley.

Stated summarily, there is a sociological need for increasing agricultural income in the area; there is interest; and the requisite land, labor, and water resources are available. High-value horticultural crops could feasibly provide this increased income and also stimulate the development of light industry, such as food processing plants, which would further aid rural development.

In 1962 staff members of the Department of Horticulture at I.S.U. grew trial plots of several kinds of vegetables on two farms at Whiting and Onawa in Iowa's Monona County. Results indicated that certain vegetable crops would produce suitable quantity and quality in the Valley, but some others were injured by 2,4-D air pollution at that time. Although results with some of the crops were favorable, there was lack of general adoption of vegetable production in response to the 1962 trials.

Many factors probably were involved that prevented wider adoption of vegetable production at that time. An important factor was the interest in sugar beet production because they would not require appreciable production changes for the growers of corn and soybeans. Since 1962, however, the sugar beet market has disappeared from the Missouri River Valley because of low sugar content of beets and other factors, and there is again interest in finding high-value crops to be produced in this area.

In response to the interest shown by area residents, personnel in the I.S.U. Department of Horticulture, along with Sioux City Area Crop Specialist, Kyle Peterson, and Monona

County Extension Director, Larry DuVal, in 1971 grew plots of vegetables on the Otis Henderson farm near Whiting and on the I.S.U. Research Field at Onawa. The Western Iowa Experimental Farm Association cooperated in the research, and the Iowa Development Commission provided part of the financial support.

Plots on the Otis Henderson farm were designed to determine which vegetable crops are suited to the area. Information also was obtained on disease problems, weather-related problems, and other factors relative to commercial vegetable production. Both fresh market and processing cultivars were included in the trials. Particular emphasis was placed upon cultivars suitable for machine harvest. Some of the vegetable crops investigated are short season, and would thus allow efficient land utilization through double cropping.

Vegetable crops investigated included snap beans, cucumbers, sweet corn, tomatoes, squash, lima beans, muskmelons, watermelons, parsnips, dry beans, and others. A strawberry planting also was established, and at least one cultivar, 'Stop-light', developed by I.S.U. horticulturists, will be harvested with a mechanical strawberry harvester being developed by scientists in the I.S.U. departments of Horticulture and Agricultural Engineering.

Several processing companies have expressed interest in the area for possibly supplying such vegetables as tomatoes, pickling cucumbers, and snap beans. These companies supplied seeds for the trials and have shown interest to the extent of visiting the plots and otherwise keeping abreast of developments concerning the trials.

A heavy rain in June caused some soil crusting. Large-seeded crops, such as snap beans, germinated and were able to push through the crust, but small-seeded crops, such as tomatoes, emerged to only poor stands. A later planting of direct-seeded tomatoes came up to a nice stand. The only insect problems evident were bean leaf beetles and cucumber beetles, and these are readily controlled by non-persistent pesticides.

Farmers in the area are used to growing highly mechanized crops, such as corn and soybeans, and therefore would probably be reluctant to grow any vegetable crops that are not likewise highly mechanized. Mechanical harvesters are available for such crops as tomatoes, cucumbers, sweet corn, and snap beans, and, if commercial vegetable production is expanded in the area, those machines would most probably be used.

Following is a report on results of the 1971 trials. Out-

¹ Department of Horticulture, Iowa State University, Ames, Iowa. Journal Paper No. J-7201 of the Iowa Agriculture and Home Economics Experiment Station, Ames, Iowa. Project No. 1768.

standing yields of snap beans were produced in the vegetable trials; yields of up to 7 tons per acre were obtained from the test plots. The yield results were gathered from three different cultivars and from plantings made on four different dates. The cultivars 'Bush Blue Lake 274', 'Gallatin' and 'Apollo' were planted May 8, May 24, and June 5. 'Bush Blue Lake 274' alone was planted June 14. 'Gallatin' and 'Apollo' were planted in approximately one-tenth-acre plots. 'Bush Blue Lake 274' was planted in approximately one-fourth-acre plots.

Yields of 'Bush Blue Lake 274' ranged from about 7,500 lbs. per acre to 14,000 lbs. per acre, 'Gallatin' from 7,500 to 11,500 lbs. per acre and 'Apollo' from 8,500 to 11,000 lbs. per acre. Average snap bean yield was 5 tons, and average per acre value for a single crop was \$220. Double cropping would be expected to increase this substantially.

A fall planting of 'Bush Blue Lake 274' made July 31 was hit by an early frost September 23 when pods were not yet ready for harvest. The growing season in that area is long enough to produce two crops of snap beans per year if the second crop were planted about mid-July.

Pickling cucumbers and sweet corn also were given extensive tests on the 5-acre test field. Plantings of 'Pride of Canada', 'Tendergold', 'Xtra Sweet', and 'Iochief' sweet-corn cultivars were made on May 13, May 27, and June 14. Approximately one-tenth acre of each cultivar was planted on each date. Yield results were based mainly on the number of salable ears per acre produced; however tonnage was determined. 'Pride of Canada' produced an average of 16,500 ears per acre; 'Tendergold' 17,900 ears per acre; 'Xtra Sweet' 17,750 ears per acre and 'Iochief' 19,250 ears per acre. Per

acre value of the sweet corn averaged about \$250 if grown for processing, and \$750 if the grower were to market fresh on a retail basis.

Pickling cucumber cultivars 'Pioneer' and 'SMR 58' were tested using three planting dates and two row spacings. Plantings were made May 13, May 27, and June 13. The row spacings used were 38" and 76". In general, cucumber yields were not outstanding, although 'SMR 58' planted June 13 in 38" rows would have produced an income of \$198 per acre, based on figures supplied by a processor. This return represents a once-over simulated machine harvest rather than several pickings. Double cropping can be used with this short season vegetable crop. Tests in future growing seasons may indicate cultural practices, such as increased plant population, which might improve the yield of cucumbers.

Processing tomatoes 'Chico II', 'VF Napoli', 'Mississippi J', and 'Fireball' were field seeded by machine and came up to a good stand, indicating the feasibility of direct seeded tomatoes in the area.

Smaller plots of pumpkins, squash, watermelons, muskmelons, lima beans, northern beans, parsnips, and fresh market tomatoes were tested. Plans are underway to test further the production of cucurbits on sandier soils. Plans for growing other vegetable crops are being considered.

It seems from yield results that the Missouri River Valley has great potential for the commercial production of vegetables. The availability of water; the light, fertile soils that occur in parts of the area; and a reasonably long growing season make the Valley potentially an even greater food-production area than it is presently.