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INSTITUTO DE PESQUISAS IRI

SUMMARY REPORT

[illegible] H. [illegible] - CONSULTANT VEGETABLE CROPS

December 28, 1965 - June 27, 1966

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INTRODUCTION

The purpose of the six-month tour in Brazil as a consultant in vegetable crops as expressed in writing and orally was to help implement the vegetable research program as projected by Dr. K. B. Tyler in 1965 and to study the vegetable industry in Brazil and make recomendations for the expansion of this program. Special attention was to be given to the utilization of the campo cerrado soils in the interior and the expanding vegetable industry in the northern and southern sections of Brazil.

During the six-month period, most of the major vegetable growing areas of Brazil were visited. These areas were widely separated and located near areas of dense population from the Uruguay border north to the Belém area. Observations were made as to the vegetable species grown, cultural and fertility practices employed, pesticides and disease control measures practised at the grower level as well as in the research program in progress at the various universities and experimental institutions in the country. These observations, impressions and comments have been recorded in the monthly reports.

This report summarizes the observations made during the past six months. Suggestions are made with hopes that they will be helpful to improve the execution of a more vigorous vegetable program.

The author wishes to take this opportunity to thank Dr. K. B. Tyler (IRI) and Dr. E. T. Bullard (USAID) for recommending me for this tour and the IRI personnel and Brazilian counterparts who have made my stay in Brazil a memorable one.

IRI VEGETABLE RESEARCH PROGRAM

The vegetable research projects sponsored by IRI are located at Matão (São Paulo), Pelotas (Rio Grande do Sul), Planaltina (Brasilia), Tamanduá (Brasilia), Kilometer 47 (Guanabara), Curitiba (Paraná), Recife (Pernambuco), and Sete Lagoas (Minas Gerais). The areas are widely separated by distance and climatic conditions. The projects are under the direction of Dr. K. B. Tyler, Chief of Party, Rio de Janeiro and under the supervision of a Brazilian agriculturist stationed at each location. The

great distance between project areas made frequent observation and supervision of the test work a major handicap in the present program. This handicap was further aggravated by poor communication and logistic problems. There is a strong and immediate need for a system that will permit closer contact and supervision of the test work and improve the communication between the test areas and the Rio de Janeiro office. Under the present system, many of the field tests could be lost and the results difficult to interpret.

The present program could be made more effective by utilizing fewer locations for test work and concentrating the research efforts at these selected stations. A horticulturist should be stationed at each station to direct the vegetable program whenever possible. An alternate plan would be to include the regional director or an American technician located in the various areas on the vegetable projects. This would provide assistance and encouragement to the Brazilian counterparts and establish better communication between the project personnel and the Rio office.

The research effort was divided arbitrarily by subject matter into three general categories: (1) Fertility, (2) Varietal and cultural studies, and (3) Pesticides and disease control. These tests were utilized to educate and train Brazilian technicians in research methods and techniques as well as to gain information to aid the vegetable industry. Considerable emphasis has been placed on plant breeding and genetics in Brazil. I believe this is good, but should be confined to those areas such as São Paulo-Rio de Janeiro and parts of Southern Brazil where considerable advancement in vegetable production has been made and where disease resistance and better adapted varieties are critical needs of the industry.

It is generally conceded that as the development of an industry advances a proportionately larger demand for research is created if continued progress is to be maintained. Thus in the more highly developed areas of São Paulo, Rio de Janeiro and parts of southern Brazil the need for research is as great if not greater now than when the production of vegetables were initiated. To minimize or de-emphasize research assistance in these more developed areas would be detrimental to the vegetable industry as a whole.

During the initial phase of the IRI's program, especially in new areas, emphasis should be placed on varietal and fertility tests to determine what vegetable species can be grown at different locations in Brazil and the nutritional requirements necessary for good production. The program should not be overly concerned with economic considerations since economics of production will change with time and the decisions of this nature rest with the growers.

The program for 1966 consists of approximately 16 Experimental work plans and over 30 separate field tests. The status of these tests have been reported under separate cover, Semiannual Report May 1, 1966 and

Progress Report, June 20, 1966.

The facilities for laboratory work, storage, and equipment for field work, etc. available at the various experimental locations varied considerably and in general were either poor or inadequate. The noticeable exception was at Matão (São Paulo), where an active research and training program for Brazilian technicians was underway. By contrast, at Planaltina and Tamandua stations in the Brasilia area, both facilities and equipment required for a good research program were lacking or not available. Administrative facilities at most locations were good or adequate. Since facilities and other conditions for research are favorable at Matão, the expansion of the present program should be encouraged. To create conditions as good at other less endowed experimental sites which would serve the same general production area would only delay the research program. One of the most noticeable deficiencies at most experimental stations was the lack of equipment for plot work. Large soil preparation equipment was available; however, equipment for seed bed preparation, cultivation, bed shaping, packing, etc., was not available.

Of the agricultural areas visited, conditions at Pelotas relative to equipment, facilities and personnel offer the best promise for rapid and immediate expansion of the vegetable program. The most important advantage to the IRI program was the permanent status of the personnel. All the cooperating members were either tenure members or well established members of the experimental station or the University. This stability does not exist at the other stations where IRI has cooperative work and may present a problem in the future expansion of the vegetable program. A complete survey of the canning industry, seed production and fresh market production potential for this area would yield the immediate needs of the industry. Assistance could best be offered by financial support and by stationing a horticulturist in the area, but the program could be maintained by financial support and carried by the Brazilian staff already cooperating with IRI projects.

An American technician (horticulturist) is needed in the Brasilia area as soon as possible to guide the studies in progress on the campo cerrado soils. The projects at the present time are under the supervision of young agronomists and possibilities are good that they will be going to the United States for further studies in the near future. The work at Matão, Brasilia, and Sete Lagoas could be coordinated and supervised from Brasilia. The facilities are limited and working conditions are difficult at the present time; however, with plans being made for an Experimental Station at Planaltina, the work in this area could be expanded in the future.

The present training program for young Brazilian agronomists does not contribute significantly to the IRI research program and will not unless some stipulations are made that will return these trainees to the program. An additional program should be initiated at Matão to train "field technicians." These trainees (no college degree required) should be trained in cultural techniques and utilized to maintain field plots and provide assistance and security to both the American and Brazilian technicians in the execution of a research program.

The problem of public relations and personnel morale in cooperating institutions was adversely affecting the IRI program and could become worse. The problems that bothered the Brazilian agronomist were primarily financial and personal. However, efforts should be made to resolve these problems in order to obtain and retain good personnel. Problems concerned with IRI projects can be minimized by better and more frequent communication between American and Brazilian technicians; however, the major or basic problems rest with the Ministry of Agriculture of Brazil. The Ministry of Agriculture must create conditions which will attract and retain good personnel. Since 1965, IRI has lost the services of five or more trained agronomists cooperating with the vegetable program. Conditions at Kilometer 47 have degenerated to such an extent that continuation of the vegetable program at this station would not be profitable unless drastic changes are made in the present arrangements. Northern Brazil does not have sufficient number of trained personnel to develop a good program, and until more horticulturists are available in the North, it would not be profitable to consider a large-scale research program for the area.

Overall, the approach to the IRI cooperative vegetable research program was encouraging and a good start was in progress. Considerable caution should be exercised in expanding this program too rapidly or too extensively without adequate facilities, equipment, finance, and American personnel. This would be particularly true for Northern Brazil, where both facilities and personnel were limited and existing conditions were not encouraging for a sound research program. A large step forward could be made if greater flexibility were allowed in existing regulations which would permit cooperation with institutions, experimental stations, etc., irrespective of affiliations, where working conditions were favorable. Careful consideration should be given to cultural techniques used in experimental work, not only from the standpoint of ease and efficiency of conducting the tests, but with the thought that these methods may be useful and adaptable to the industry. Operations such as seed bed preparation, bed shaping and packing, fertilization, seeding, etc., blend themselves to mechanization, and the vegetable industry would profit by adapting these methods.

Future expansion of the research program would serve the industry best by placing considerable emphasis on seed production. This was a critical need throughout Brazil.

SUGGESTIONS FOR THE PRESENT PROGRAM

Field Tests and Projects

1) Varietal and fertility trials should be emphasized and these projects converted to long-term, continuous projects to minimize delays and provide ample time to procure necessary seed, fertilizer, etc.

2) Most other projects would benefit if converted to continuous long-term projects.

2) Varietal trials should be integrated with date-of-planting trials and conducted one year prior to fertility or other major tests to ascertain the best variety and time of planting.

3) Plot designs should be simplified and the statistical analysis handled by the supervisor of each test to eliminate the delay encountered when the data is shipped to a statistician.

a) Translate Dr. T. Little's book into Portuguese.

4) The size of test plots should be enlarged or the number of replications increased to minimize inherent variability where results are determined by yield data.

5) The practice of replanting missing areas in test work should be stopped. When stands are poor, the whole experiment should be reseeded to minimize variability.

6) Critical test work should be conducted on the experimental station where the agronomists are stationed to maintain complete supervision of the projects. The use of grower cooperation should be encouraged, but the work or test confined more to demonstration-type experiments that require the minimum amount of supervision and expense. Success of these tests will rest with the choice of good cooperators.

7) Preparation of a better seed bed. A better seed bed can be prepared by using a land leveler, bed shaper, and packer to firm the soil. This will be necessary before mechanization can be realized.

8) The research work in Tamanduá should be terminated and all future studies maintained at Planaltina. This would eliminate much of the difficulties now present in Brasilia. The studies at Planaltina should be expanded to include pesticide studies.

9) Studies at Kilometer 47 should be terminated until better working arrangements are created by the Ministry of Agriculture.

10) All vegetable test work at Sete Lagoas should be conducted in fields of IPEACO at the present time.

11) All AR vegetable projects should be cooperative work with stable or tenure members of the Experiment Station. Young agronomists and trainees should be utilized as assistants to these projects.

12) Expansion of the research program in Northern Brazil should be held up until better working conditions and more Brazilian technicians are available.

13) The work in the Pelotas area should be expanded. The work should emphasize the problems in seed production.

a) Part of the seed work can be maintained at Curitiba.

Facilities and Equipment

1) A storage and work facility should be established or existing facilities remodeled at each location. This facility should include a good seed and fertilizer storage.

2) A year's supply of fertilizer, insecticides, and pesticides should be stored and available for immediate use at each test area.

3) A small 4-wheel tractor for plot work should be purchased for vegetable research. The following attachments should be included: seeder, fertilizer attachments, sprayer, duster, and a full complement of cultivating tools.

4) Seed bed preparation equipment, bed shaper, packer, harrow, etc. should be available for preparation of test plots.

5) A good tilt bed trailer (for attachment to a pickup or Rural) to haul the tractor and other equipment would add mobility to the equipment.

6) Additional irrigational equipment including a portable pump, pipe and sprinkler head would be useful during the dry season at Brasilia and Sete Lagoas and other new areas to insure good germination and explore the possibilities of growing in the dry season.

7) Whenever possible, equipment purchased for the vegetable program should be Brazilian or one which is easy to maintain and purchase repair parts for.

8) Cold storage facilities would be beneficial in Pelotas if studies in seed production are expanded. Four portable walk-in types would be adequate at the present time.

9) Seed cleaning equipment for small seeds is needed in Curitiba as well as other equipment if the work in this area is to be expanded.

10) Arrangements should be made for the rapid procurement of seeds from abroad and locally and stored for use.

Personnel and Training

1) Employ more horticulturists from the U.S.A. as well as Brazilian agronomists to expand the present vegetable program.

2) Utilize Ceatão more extensively for a training and research program. The training should be arranged so that the agronomist will spend the bulk of his time working in his subject matter. This will permit the instructor to have reliable assistance on his projects and to expand his research program.

3) A program initiated to train technicians (non-college graduates) in cultural techniques. These trainees to be utilized to maintain the test work day by day and would be particularly advantageous during periods when the agronomists are absent for extended periods.

4) Brazilian agronomists sent to the United States at USAID-IRI expense should be retained in the program after their return for at least the equivalent time they were supported in the U. S. A.

Miscellaneous

1) A system for procuring and distributing research publications. Dr. Fulton has started a system that can provide a good basis for this program.

2) Exchange of project plans and results among personnel working in vegetable crops with IRI to keep all members informed as to the work in progress.

3) Have an annual meeting of vegetable crops personnel to discuss past and future plans and create a favorable atmosphere for cooperation within the organization.

4) Encourage publication by the Brazilian technicians. (A merit system for advancement would help promote publication.)

5) Provide transportation for consultants during the week ends to observe the industry more closely.

6) Provide an equitable arrangement to permit the consultant's wife to accompany or visit him during his tour of duty when his tour is longer than three months.

Recommendation

The IRI vegetable research work should be located at two or three selected locations in Brazil. This would permit greater use and efficiency of equipment, facilities, personnel, and money. The selection of Recife, Brasilia, and Pelotas would cover the major climatic areas of Brazil. The Matão station should be maintained for both research and training. The number of locations should be expanded after the initial program has been well established.

The outlying areas should be handled through a vigorous extension program. This program would provide grower contact and mutual exchange of ideas and problems.

THE VEGETABLE INDUSTRY IN BRAZIL

Observations and Comments

1) The vegetable industry was made up largely of small, family farm operations. The production per unit farm was small and seasonal. There appeared to be a trend towards crop specialization. However, on most farms the production was diversified. Most of the produce was sold at local markets, and these markets were more or less sheltered from competition, since very little fresh vegetables were shipped between production areas. This type of vegetable farming will probably persist around large cities until better highways and transportation systems are developed or economic conditions dictate a change.

2) The growers are predominantly of Japanese ancestry, and many of their children have continued in agriculture. Most of the growers I talked with were not trained in agriculture and have developed their skills through practical experience. There was a strong desire and realization for the need of education and training in agriculture among the growers, and I believe that they would welcome cooperative participation in research projects and extension work.

3) The business phase -- shipping and marketing -- is handled through grower cooperatives. In areas where cooperatives do not exist, the growers depend on the retailer to collect and market his produce or a distinct separation among grower, truckers and retailer exists.

   a) Cotia - Originally this organization was established to aid the Japanese growers, but its membership is now open to all Brazilians engaged in agriculture. The services offered by this organization to its members are numerous and include, publication of agricultural journals, and extension service type work. Most of the growers I talked to have confidence in this organization; consequently, its expansion into Central Brazil has been rapid and is expanding towards Southern Brazil.

   b) It seems only logical that in the future these large cooperatives will become more actively engaged in seed production. What effect this will have on private seed companies is difficult to predict. At the present time, I would say the cooperatives exert tremendous influence on the price, grade, and flow of vegetables on the market.

4) The degree of development of the vegetable industry in the various production areas differ so much that no generalization can be made. It seems reasonable to conclude, however, that the São Paulo-Rio de Janeiro area is the most highly developed. For the most part, the terrain in this area is mountainous and the lowlands are subject to flooding during heavy rains which nearly excludes the possibility of this area being utilized for large-scale mechanized farming.

The Brasilia area (campo cerrado) is favored with good climate and terrain for large-scale farming, but has very poor soils. Conversation with growers and experimental studies suggest that vegetables can be produced in this area but will require supplemental fertilization which will be expensive. Until the population in the interior enlarges and can support a large vegetable industry, the principal outlets will be São Paulo and Rio de Janeiro markets.

There has been a large migration of growers from the São Paulo area into the state of Parana. This area has the advantage of deep soils, climate, and terrain for large-scale production of many crops, and a large potato industry has been developed in the interior. Produce from this area can be shipped by trucks to the São Paulo market in 10 to 12 hours.

a) Before large-scale shipments of perishable vegetables can be made, improvements in shipping containers, refrigerated trucks, handling techniques, etc. will be needed as well as good roads.

In Southern Brazil, a large interest has been shown in the processing industry. At the present time, fruits, corn, peas, peppers, asparagus are being canned for export for foreign as well as the domestic markets.

Vegetable production in Northern Brazil was quite limited. Notable exceptions were a tomato canning venture in Pernambuco and the production of peppers in the Belém area.

5) All indications are that successful production of vegetables in Brazil will be dependent on the wise use of commercial fertilizers. Fertilizer is difficult to obtain and exceedingly expensive at this time. Assistance in this field would be beneficial to the growers.

6) Good seeds are not readily available in Brazil. Many areas in Brazil have conditions favorable for the production of seeds, and this industry should develop rapidly in the next few years.

7) The supply of produce on the market was cyclic, going through periods of abundance and negligible supply. The effect of seasonal production could be minimized by utilizing irrigation during the dry season. Climatewise, many areas could produce vegetables on a 12-month basis with irrigation. The system of irrigation used in Brazil was primitive on most vegetable farms. Studies and information in this broad field would be beneficial to the growers.

a) Production during the dry season should have fewer disease problems and be easier to control than during the rainy season.

8) Probably the biggest asset to the vegetable producers was the unlimited supply of cheap labor. The average wage was approximately $1.00 a day. As each area develops and competition for labor increases, the supply of field labor may present more problems in the future and partial mechanization of the farming operation should be considered.

a) Practices such as direct seeding, machine transplanting, tractor cultivation, and fertilization, etc. could be used effectively at this time.

b) The low wages of the field workers and many of the other less technical skills also presents the problem as to whether this large portion of the population can or cannot afford to purchase vegetables.

9) Brazil has land area suited for expansion in vegetable production and climate for good production. Expansion of production will undoubtedly continue; however, one can't help but wonder whether the allied industries will keep pace with this expansion or the expansion be dependent on the expansion of allied industries.

NORTHERN BRAZIL

April 30/66 - May 18/66

Belém

The production of vegetables in the Belém area was very limited. Small acreages (less 1 acre) of tomatoes, peppers, carrots, lettuce, cucumbers, beans and cabbage were observed in the field and small quantities were being sold in the markets. With the exception of cabbage and cucumbers the quality was poor.

The production area in the past was immediately adjacent to the city, however it was slowly shifting to areas approximately 100 km from the city. The factors contributing to this shift, I was told was excessive rainfall, competition for and poor soils, labor supply and completion of paved roads. Available lands for future expansion was unlimited, but production appears to be dependant on the use of commercial fertilizer. Commercial fertilizer mixes was being sold in the area F.O.B. São Paulo between $250.00 and $325.00 per ton.

The principle market at this time was Belém. The growers felt that this market was nearly saturated since harvests on all the farms in the area occur at the same time. The production of peppers appears to be the most favorable crop for this area at this time from the standpoint of culture, profit and export potential. The acreage of peppers being grown was not known, however indications from the number of new plantings observed suggests that this market may soon be saturated.

Prospects for research in vegetables in the Belém area was discouraging. Facilities at the experiment station were limited and only one trained agrônomo in vegetables was working in the field of vegetables. No experimental studies were observed. Apparently no active contact between the research and growers are maintained. For grower contact probably the best source for information and contact would be through the banking and credit lending associations in Belém.

Recife

Very little if any vegetable were observed growing in the area immediately surrounding the city of Recife. Most of the produce was trucked into the city from surrounding areas. Trips were taken to Vitoria and Bonita area where vegetable were grown for the local market and to Pesqueira where tomatoes are grown for the canning industry. Difficulties in arranging transportation did not permit a trip into the Rio São Francisco area.

The Vitoria and Bonita area was mountain-type terrain and the production was confined either to the limited valley floor (subject to flooding)

or the hillsides which had slopes in excess to 10 percent grade. This area in the future may expand but probably will be limited to small local market production. Culture will be of the most difficult type and probably dependent on hand labor.

From the standpoint of terrain and available land the Pesqueira area has potential for expansion in the future. At the present time tomatoes was the principle vegetable grown in the area, but production was hampered by disease problems. The growers (share croppers) need help in both cultural methods and disease control. Introduction of new tomato varieties and other vegetable species would aid the canning industry.

Only one trained personnel was working in vegetables in the area. He was located at an experiment station away from Recife. Little or no facilities were available in the area for vegetable research. Distance between growing areas and poor transportation system presents a major problem to research in this area.

Salvador

Only one vegetable farm was visited in Salvador. This operation was under the direction of an American. His biggest problem was in obtaining a good seed source since none was available in the area.

Comments

To do vegetable research in the northern sector of Brazil, TRI would have to supply both facilities and personnel in order to get any kind of a program started. At the present time I would suggest a strong extension program and minimize the research effort.

Dr. Fulton has a nucleus for a good library system. This system could be used by other areas to keep the Brazilian agronomes as well as the American staff abreast with recent developments.

FINAL PROGRESS REPORT

FRANK H. TAKATORI - CONSULTANT VEGETABLE CROPS

June 20, 1966

BRASILIA

Projects 137-138: Sweet Corn

Sweet corn harvests were started May 18, 1966 at Planaltina and Tamandua. Large differences were visible between fertility treatments (138) and among varieties (137) and these treatment effects should be significant. Some differences were observed between tests at Planaltina and Tamandua, but these differences were small.

Both trials should be completed by the latter part of June. These tests will be followed with an onion variety, date of planting trial (137) and another sweet corn test (138) in July or August.

Instructions have been forwarded to Edson Lobato and Wilson Viera by mail. A copy of the plot plans are filed in the Rio office and in the folder marked "Brasilia".

Future studies at Tamandua should be discouraged, and many of the problems in the Brasilia area would be solved.

MATAO

Projects 137-138: Sweet Corn

Both sweet corn tests were completed in May, 1966. The data have been tabulated and are being analyzed (check with T. Tanaka).

Project 137 will be planted to onions. The first planting date was June 5, 1966.

Project 138 will be planted to cabbage. Seeds for this study were sown in a nursery May 12, 1966 and transplanted May 27, 1966.

Project 12: Onions

Six varieties of onions will be grown (planted June 5, 1966) and harvested for a storage study. This test will be conducted in the area where the Okra test was conducted in May 1966. Some financial assistance was given to growers tests with onions in Guatapara and Moji das Cruzes (São Paulo) from this project. At both locations the tests are similar and should yield information which will be available to IRI.

Miscellaneous Notes: T. Tanaka should be encouraged to prepare manuscripts for publication. I suggest that IRI keep pressure on him before this information is lost. It may be advisable to provide him assistance for his field work until this is accomplished.

SETE LAGOAS

Project 82

Part II: Brassica (Cabbage)

Location - On fazenda in Betin near Belo Horizonte.
Nursery - Planted December 15, 1965
Transplanted - January 29, 1966
Leaf Samples - February 11, 1966
March 4, 1966
Harvest - Initial, March 5, 1966
Final, April 24, 1966
Data - Tabulated and ready for analysis; to be submitted to Dr. Tyler in July, 1966.

Part I : Tomatoes

Nursery - Planted January 27, 1966
Transplanted - February 18, 1966
Leaf Samples - March 4, 1966
May (?), 1966
Harvest - May-June, 1966; should be complete by June 20, 1966.

Note: This test should be moved from the growers field (two hours' distance) to the experimental station to insure better control and supervision of the test work.

Project 137-138: Sweet Corn

Harvests started around the 1st of June. Although the plots are not as uniform as at Matão and Brasilia, the differences in varietal response are larger. Much of the unevenness of the plants are the result of reseeding only the blank areas rather than replanting the entire experiment.

Harvest should be completed by the 1st of July. Instructions for continuance of these tests have been left with Dr. Gonçalo de França. Tanaka (Matão) should come to Sete Lagoas to provide assistance when this test is initiated.

Project 87: Cabbage - Cauliflower

Adauto Zunti was not on the station; however, both projects were completed. Data should be submitted soon.

The field was being prepared for further tests with onions. Tentative planting date was June 8, 1966.

Project 85

Part I: Cabbage

The plants are just starting to head.

1) Dacthal (Diamond Alkali) at 10 kg. per hectare looks promising as a herbicide for cabbage.

2) Karmex was toxic to plants (2 kg. per hectare).

3) Eptam (6 liters per hectare) shows plant discoloration.

Part II. Onions

Transplanted June 5, 1966.

Note: Request a supply of Dacthal for future tests. The following herbicides have not been checked in Sete Lagoas and should be ordered:

a) Vegadex
b) Rondax
c) Alanap
d) Aminotrizol

Project 84: Garlic - Onions

This project has been discountinued; however, the $3,500,000 was made available to purchase the compressor and complete the storage facilities. When these facilities are completed, it may be possible to reactivate this project for storage studies. Because of location, I would suggest onion or garlic studies initially. Possibilities exist that we may be able to store onions or garlic for shipment into the São Paulo market in June when prices are high.

KILOMETER 47

Project 159: Tomatoes

Field treated with Vapam did not control nematodes. Field was

retreated with Methyl Bromide. Nursery started May 25, 1966. Seedlings look good.

Project 160: Peppers

Nursery planted - February 2, 1966
Transplanted - March 11, 1966
Harvested - Initial, June 1966
Termination, July 1966

Avelar looks good, performance superior.

Project 161: Okra

Nilton Rocha Leal was not available; however, the tests were observed. Project should be completed successfully.

Note: Sudo plans to resign in September after our present studies are completed. I suggest we terminate all vegetable work at Km. 47 until more satisfactory arrangements are made at this station. Since 1965, IRI has lost three trained agronomists working on vegetable crops.

PELOTAS

Project 88: Seed Preservation and Storage

Onion seeds were packaged and stored in June 1966. Storage studies are at three locations and under three types of storage environment. Germination counts were taken prior to storage.

Project 74: Fertility of Cauliflower

The plots are being harvested at the present time. Dr. Rocha was not in Pelotas; however, the plots were visited. These studies will be followed by studies with peas.

Project 89: Fertilization of Asparagus

The asparagus plantings are in the dormant stage. Preparations were being made to prepare the beds for cutting. Variety 72 was completely dormant. Some of the other varieties showed some green fern.

Project 92: Potato Fungicide Trials

The studies were terminated June 14, 1966 and the potatoes harvested for yield data.

Project 93: Peas

The test area was moved to Rosario (with Swift Co.). To be planted in July, 1966. This area grows 900 hectares for canning. This shift in plot location was encouraged since very little acreage of peas are produced close to Pelotas.

Project 90: Carrot Seed

Stecklings were produced in Pelotas and planted at three locations in the high elevation areas of Southern Brazil June 17, 1966. This test offers good promise for developing information for the seed industry. At the present time, the set of seeds was poor at the lower elevations near Pelotas.

Project 91: Potato Virus

Dr. Bertels was in Germany. The tests were started, but the present status of the tests is unknown. It is understood, however, that Dr. Bertels' assistants have carried on these studies during his absence.

Note: The expansion of the vegetable program is highly encouraged, primarily because of the stability of the personnel. I believe this area should encourage studies to aid the seed industry. A greenhouse has been ordered for the station. I suggest that these facilities be complemented with controlled storage facilities to aid in the seed work. Probably the cheapest and most rapid procurement of these facilities would be to order the portable walk-in type from the United States.

CURITIBA

Project 88: Seed Preservation and Storage

Onion seeds are stored in the laboratory. Part of the study is with Pelotas.

Project 74: Cauliflower

Harvest complete. Good stand was obtained and harvest excellent

except in the check. Studies to be continued with peas

Miscellaneous Non-IRI Projects: Cauliflower, Cabbage, Lettuce

These are date of planting tests. Look good, and yield data and seed yield data will be obtained. I suggest IRI support these projects.

Note: There is a strong desire at this station to develop a program independently from Pelotas. They would continue the cooperative work with Pelotas also.

It has been suggested that they submit a proposal -- I believe they wish to do seed work in cooperation with Cotia on five vegetables. I believe it will be profitable since Dr. Xanon and the agronomist for Cotia are very close friends.

FHT:mbp.