第７章　技術協力の可能性とマスタープラン

1．技術協力の必要性、可能性

すでに前章までに記述した如く、ブラジル国では、熱帯から温帯までの様々な気候の広い国土を持つことから野菜の種類は約１００種類はあるといわれるほど豊富で、生産・消費も増加してきているが、ブラジルの環境に適した品種、栽培方法等が確立していない状況にある。

このため、これらの技術を総合的に日本から移転するべく１９８１年３月１９日付け公信第２１０号によりブラジル政府よりプロジェクト技術協力の要請が行われた。

また同年、ブラジル中央部及び西部における野菜生産に関する研究と全ブラジルの野菜研究の調整機能をあわせもったＣＮＰＨ（国立野菜研究センター）がブラジリアに設立され、技術協力の受皿の準備もなされたこともあり、ブラジル農務省は本件を重要視して、１９８２年１１月スタビレ農務大臣（当時）から田沢農林水産大臣（当時）に対し本件協力実現方の要請を行った。

ＣＮＰＨはブラジル国の野菜研究の中心的存在であり、その研究体制及び研究機器の整備の緊急性は高く、同センターへの技術移転により、その技術が他の試験場にも応用され、それぞれの地域の野菜生産に貢献することが期待できる。

また、野菜の生産、販売の大部分は日系人により行われているので、この面でも良い影響が期待できる。

野菜の生産の増大はブラジルの人々の食生活、栄養の改善につながるうえ、現在、輸入に頼っている野菜の一部については輸入量の削減に結びつき、国家経済の改善の一助となるものである。

上述の点で、本件技術協力の必要性と効果は十分にあるものと考えられる。

2　要請された研究分野、内容、協力の方法

１９８１年３月の要請内容は、ＥＭＢＲＡＰＡのＣＮＰＨを協力対象機関として、５ヵ年（１９８４年～１９８９年）の技術協力の要請ということであり、対象機関及び協力期間についてはその後の変更はなかった。また研修については、公電では協力期間中毎年研究員８名、管理職２名程度とされている。

協力要請のあった研究分野は次のとおりである。

① 土壌分析
② うり類育種
③ 葉菜類育種
④ 農業機械

⑤ ウイルス学

⑥ 栽　培

⑦ 昆虫学

⑧ その他必要に応じ短期専門家を派遣する。

今回の事前調査団が訪伯した際、ＣＮＰＨから協力要請を提示された研究分野は次のとおりである。

ＣＮＰＨの研究を経済的に重要性の高い野菜について集中的に行う。すなわち以下の種類の野菜について技術協力を受けたい。

ブラシカ類……ブロッコリー、カリフラワー、キャベツ

ウリ類……カボチャ、スイカ、メロン、キュウリ

タマネギ

ニンジン

トマト

パレイショ

上記の野菜はブラジルの全野菜の流通量の６２％に相当する。

研究協力の重点分野

育　種

作物保護

植物栄養

機械化

植物生理

作付体系

3　協力要請事項の検討とマスタープランの合意

これらの要請に基づいて、ＣＮＰＨ及びＥＭＢＲＡＰＡ理事等と検討を行い、その結果本プロジェクトのマスタープランを団長書簡としてＥＭＢＲＡＰＡ総裁に手交した。

4　マスタープラン案の検討過程

１９８４年７月２３日午後、ＣＮＰＡ会議室において、午前中のヒアリング、研究室及び圃場視察の結果を踏まえて協力できる分野及び対象野菜のしぼり込み等を行った。

(1) 協力分野

まず、日本側よりブラジル側提案のクラリフィケーションを求めたところ、ブラジル側は、

キャベツは日本の種子がブラジル国内全体に流通している点、バレイショはウイルス病が発生し種イモを輸入せざるを得ない状況である等多くの問題があり、研究分野については日本からの専門家派遣人数により優先順位を考えたいと述べた。日本側より通常の場合であるが長期専門家4名、短期専門家4名程度であると答えたところ、ブラジル側は、下記のように6分野の順を示した。

協力分野	内容
1 育種学	耐病性、吸肥性の高いものの作出
2 病理学	ウイルス病の研究
3 作物栄養	
4 農業機械化	野菜の植え付け等の機械を開発する。特に小型の機械。
5 水分生理学・土壌物理	かん水した水と植物と土壌との関係を明らかにする。
6 組織培養	成長点培養等の技術

(2) 対象野菜

ブラジル側よりまず提起された野菜は、①バレイショ、②トマト、③ウリ、④ブランカ類、⑤ニンジン、⑥タマネギであったが、日本側が五年の協力期間でまとまった結果を出すため作目はしぼりたい旨反論した。双方で検討した結果、ナス科野菜のバレイショとトマト及びウリ科野菜のキューリとメロンにしぼって協力を行うこととなった。ただし、ブラジル側より機械の開発（協力分野の4と関連）に関連して研究対象とする場合や、協力期間中に合意があれば、その他の野菜を加える可能性もあるのでその余地を残すべしとの希望が出された。その結果、対象野菜を次のとおりとすることになった。

バレイショ、トマト、キューリ、メロン及び日伯両国において加えることが同意されたその他の野菜

(3) 協力の内容

協力の内容に関し、日本側より特に補足して説明した点は次の通りである。

① 研究分野の各々に対象作物が全て対応するわけではない。

② 機械化は機械の開発ではなく、一部分の改善を含む既存機械の利用を主体とする。

③ 水分生理学は土壌・作物・水分の関係を探求することを主体とする。

(4) 専門家派遣

当方より、協力分野は長期派遣専門家と短期派遣専門家により分担することとなろうが、

通常の技術協力では長期専門家が４名、短期専門家が４名程度派遣されていると述べた。

(5) 研修生の受入れ

当方より、研究員及び高級研修生（管理職）の研修受入れが行われることについては言及したが、さらに具体的には次回以降の調査団との間で詰めることになろう。

(6) カウンターパート

専門家には必ずカウンターパートを付けることについてブラジル側が確言した。

(7) 機材供与

当方より、一般に年間5,000万円程度の機材供与が行われている旨述べた。

(8) 協力対象及び協力期間について

協力の対象機関はＣＮＰＨとした。ブラジル側は将来においては他州の支場等にも協力を拡げてほしい旨述べたが、日本としては中央研究所としてのＣＮＰＨに協力を行い、他にも応用できる技術はＣＮＰＨが普及する形が望ましいと述べ、ブラジル側も了解した。

(9) その他

日本の協力が始まった場合、専門家はブラジルの研究者、外国コンサルタントとは別に位置付けし、カウンターパートは必ず配置することを約束した。

5 協力開始時期と協力期間

協力開始時期について、ブラジル側はできるだけ早く協力が開始されることを望んでおり、調査団は手順をふんで昭和６０年度のできるだけ早い時期に実施協議調査団（Ｒ／Ｄミッション）を派遣できるよう日本側当局に伝え、技術協力協定の補足取極の締結を早めることとしたい旨述べた。

協力期間は、通常の協力の最大期間５年間とした。ブラジル側は更に２～３年の延長を希望したが、それはエバリュエーションの時点で検討し、必要ならば延長することも有り得ると説明したところ、ブラジル側は了解した。

6 今後の検討・把握すべき事項

1) 今回調査した研究機関はＣＮＰＨ、カンピーナス等数例に過ぎず、全国的な野菜研究については、さらに組織的な資料の収集と拠点視察調査が必要である。

2) ＣＮＰＨの要請研究内容には全国対応のものが多いので、全国の野菜栽培の実態を把握しておく必要がある。

3) 野菜栽培に関する研究の現状と問題点の整理及びＣＮＰＨの要請研究内容の詰めが必要である。

第８章　専門家の生活環境

1. 専門家に対するブラジル側の対応

本プロジェクトの担当機関であるＥＭＢＲＡＰＡは、現在日本との間でセラード農業研究センターに対する研究協力を実施中であり、同プロジェクトにおける日本人専門家への対応と同程度の便宜供与を、本件に対しても保証している。

具体的には、専門家住宅の無償提供、住宅からＣＮＰＨまでの送迎バスの運行（無償）、専門家チームへの車両１台、秘書１人の提供が主な内容である。

住宅は、ＣＮＰＨから約４０Km、自動車で約３０分の距離に位置しているブラジリア市内に準備される予定であり、同市はブラジルの首都でもあることから、専門家の拠点としては、通勤、買物、公共施設等の便利さ等から判断して最適と考えられる。

2. 生活事情

(1) 交　通

ブラジリアにおいては、バス便が発達しており、市中心部のバスターミナルからは各方面別の長距離バスが数多く発着している。

専門家住宅から中央官庁へは至近距離であるが、ＣＮＰＨへの通勤は前述の送迎バス（朝夕１便運行）を利用することとなる。その他、日中については、前述のマイクロバスが調査団はりつきとなり、それを業務に利用することが可能であるが、朝夕に超過勤務等を行う場合は、路線バスの本数が少ないことから、自家用車を利用せざるを得ない。

(2) 保健衛生

ブラジリアは緯度が低いにもかかわらず、高地にあることから、年中、日本の秋を思わせる快適な気候であり、健康的な風土といえよう。医療施設に関しては、市内に多くの病院、薬局があり、病気の治療、日常の医薬品の購入に不自由はない。

(3) レクリエーション

ブラジリアにおいては各種のクラブがあり、これを利用してスポーツ活動を行うことが可能である。また長期滞在の日本人の間ではゴルフも盛んであり、国民スポーツであるサッカー等もあわせ、盛んにグループ活動等が行なわれている。

また、郊外にはキャンプ場等もあり、魚釣り、植物や昆虫の採集、ハイキング等のレジャーを楽しむことができる。

(4) 教　育

ブラジリアには日本人学校はないが、アメリカンスクールや日系人の私塾に通わせることは可能である。子弟の教育については現地の学校への就学も含め、慎重に検討をする必要がある。

(5) サービス業

理髪店、美容院、クリーニング店、飲食店等多数あり、不自由はない。

(6) その他

ＣＮＰＨには食堂、ビリヤード等の厚生施設があり、昼食は他の研究員と一緒に食堂の定食をとることが可能である。

また、日系人を含め、日本語を話せる研究員が４人おり、特にHorino氏は日本語、ブラジル語共に堪能であり、本件における活躍が期待される。

付　　属　　資　　料

1. 団長書簡

Brasília
July 24, 1984.

To Dr. Eliseu Roberto de Andrade Alves
President
Brazilian Agricultural Research Corporation
Ministry of Agriculture
The Federative Republic of Brazil

Dear Sir,

Since the arrival at the Federative Republic of Brazil on July 15, 1984, our team conducted a field survey in São Paulo State and Brasília, DF, and had a series of meetings in Brasília with you and your staff members concerned with the Vegetable Research Cooperation Project in the Federative Republic of Brazil.

Thanks to your excellent arrangements during the period of our stay, the team was able to formulate the provisional framework of the Project mentioned above. And now I have the pleasure to present the master plan for the Project.

Again I would like to express our sincere gratitude for your kind cooperation on behalf of the team.

With best Regards.

Yours sincerely,

Yasutsugu Takata
Leader of the Preliminary Survey Team
The Japan International Cooperation Agency

MASTER PLAN
FOR
THE VEGETABLE RESEARCH COOPERATION PROJECT
IN
THE FEDERATIVE REPUBLIC OF BRAZIL

1. Objectives

The objectives of the Vegetable Research Cooperation Project (hereinafter referred to as "the Project") are to improve the research activities concerning the National Vegetable Research Center (hereinafter referred to as "CNPH") and materialize the improvement and development of the vegetable cultivation technology in the Federative Republic of Brazil.

2. Administrative Authorities of the Government of the Federative Republic of Brazil (hereinafter referred to as "the Government").

1) Administration

The Brazilian Agricultural Research Corporation (hereinafter referred to as "EMBRAPA")

2) Implementation

C N P H

3. Cooperation Period

Five (5) years

4. Tentative framework of technical cooperation

1) Executing Institution

CNPH

2) Subject Vegetables

Potato, tomato, cucumber, melon and other vegetables to be agreed upon between the authorities concerned of the two Governments.

3) Research cooperation fields

1. Vegetable breeding
2. Plant pathology
3. Plant nutrition
4. Vegetable mechanization
5. Tissue culture
6. Soil-plant-water relationship
7. Other fields to be agreed upon between the authorities concerned of the two Governments.

5. The Government of Japan will be responsible for:

1) To provide the Japanese experts as follows,

1. Leader
2. Experts
   1) Vegetable breeding
   2) Plant pathology
   3) Plant Nutrition
   4) Vegetable mechanization
   5) Tissue culture
   6) Soil-plant-water relationship
   7) Other fiels to be agreed upon between the authorities concerned of the two Governments
3. Coordinator

Note: Japanese experts will be dispatched in some cases as experts on short-term assignment.

2) To provide the equipment, machinery and materials necessary for the implementation of the Projects, and

3) To receive the personnel concerning the Project for training in Japan

6. The Government of the Federative Republic of Brazil will be responsible for:

1) To provide land, buildings and facilities necessary for the implementation of the Project.

2) To provide the services of Brazilian experts and other personnel necessary for the implementation of the Projects as follows:

(1) Project director

(2) Counterpart experts to the Japanese experts

1. Vegetable breeding
2. Plant pathology
3. Plant nutrition
4. Vegetable mechanization
5. Tissue culture
6. Soil-plant-water relationship
7. Other fields to be agreed upon between the authorities concerned of the two Governments.

(3) Clerical and service personnel.

3) To meet all running expenses necessary for the implementation of the Project, including those necessary for the installation, operation and maintenance of the equipment, machinery and materials.

7. For the effective implementation of the Project, a Joint Steering Meeting will be held.

Y.T

2　マスタープラン作成のための打合せ会議概要

日時：７月２４日午前８時半～１１時半

場所：ブラジリアDF、EMBRAPA会議室

出席者：

日本側：①ブラジル野菜研究協力事前調査団

団長　高多康次

団員　小須節雄

団員　吉川宏昭

団員　森山浩光

団員　国安法夫

②オブザーバー

在伯日本大使館

門脇邦泰一等書記官

ＪＩＣＡブラジリア事務所

寺内光夫所長

ブラジル側：

Eliseu Roberto de Andrade Alves	EMBRAPA総裁
José Prazeres Ramlho de Castro	EMBRAPA理事
José Maria Pompeu Memoria	EMBRAPA国際協力局長
Flávio Augusto d'Araújo Couto	CNPH所長
Luiz Potra Leto	SUBIN補佐官
Luiz Ferreir Filao	CINGRA補佐官
Paulo Brasil Paez	CNPH技術部長
Joaguim Müller P. Azevedo	CNPH総務部長

＜挨　拶＞

アーベスEMBRAPA総裁

日本とブラジルとの間の協議が順調に進んでいることに感謝の意を示し退席。

＜マスタープラン案についてのブラジル側の考え方＞

メモリアEMBRAPA国際協力局長

マスタープラン案がEMBRAPAハマリオ理事同席のもと調査団及びCNPH関係者各位の協力のもと作成できたこと及びSUBINにも参考として提出していることを紹介した。

フラビオCNPH所長

調査団が野菜の生産及び流通に高い関心をもって調査し、CNPHとの協議においても前向

きに協力をすすめる方向でまとめられたこと、ブラジル側の意見も充分に考慮し技術的な幾つかの点の修正を行ったことを示し、ＣＮＰＩＡとしても本案の承認が得られるよう期待する旨表明。

ルイスＳＵＢＩＮ補佐官

マスタープラン案については原案及び変更された案とも検討したが何ら問題はないと言明。

ルイスＣＩＮＧＲＡ補佐官

協力の内容については直接の担当であるＥＭＢＲＡＰＡ及び調査団が検討しており、何ら問題はないと思う。協定の取極の段階ではＳＵＢＩＮ及び外務省と共に作業を行う必要がある。その際にはブラジル側のカウンターパートに協力を願うことがある。

＜次の調査団の来伯時期及びプロジェクト開始時期＞

メモリア国際協力局長

取極締決のためのミッションの来る時期と本プロジェクトの開始時期について質問

高多団長

調査団としては申し上げる立場にはないがと前置き。①補足取極は行政的に外務省間で結ばれるものである。②取極締結の前にはその取極のもととなるＲ／Ｄを署名する調査団の派遣を要するが、その派遣については来年度となろう。これは予算の制約上やむを得ない。③来年度４月以降の早い時期にミッションが出せれば、その後取極を結び、すぐにもプロジェクトが始められるので、来年秋にはプロジェクトを開始できると思う。以上は、日本の関係者とも話し合う必要があり、決定ではない。

メモリア国際協力局長

取極の調印は次のミッションの来伯時に行われると思っていた。しかし、それについては良いとして、プロジェクトが来年度から始まるならば、ブラジル側でも予算をとるなど対応する考えである。

＜マスタープラン案の検討＞

技術協力の期間、協力対象の機関、協力分野、対象とする野菜等技術的な面は問題ないとされた。

ミスタイプ修正のほか次の点を確認、修正した。

(1) ＥＭＢＲＡＰＡの英訳

当初 'The Brazilian Agricultural Research Enterprise' を使っていたが、伯側より Enterprise を Corporation に直してほしい旨要望があり、日本側はＣＰＡＣの協力の際の取極の中では Enterprize を使っているところから、将来本件の協力取極締決の際に大きな問題点とされるようならば Enterprize にもどすことも検討してほしいと

付言したうえでCorporation に修正した。

(2) ＣＮＰＨの英訳

英訳を確認したが、原案どおり 'National Vegetable Research Center' でよいとされた。

(3) 日本側の派遣専門家のうちのＪＩＣＡ職員の名称について、

最初ペルナンブコ連邦大学関連の取極の中では Liason Officer が使われていたので原案もそのままとしたが、Coordinatorが望ましいとして代案を出したところ、ブラジル側側も Coordinator の方がよいとしたので修正した。

＜ブラジル側の Project director について ＞

マスタープラン案3ページ目の Project director には誰がなる可能性があるかを問い合せたところ、次の三通りの可能性があるとした。

(1) ＣＮＰＨ所長

(2) ＣＮＰＨ所長が指名したＣＮＰＨ職員

(3) 本件プロジェクトのために専従の人を別途選ぶ

しかし、いずれにしても両国で承諾された人を選ぶこととした。

以上でマスタープラン案の検討は終了し、タイピングはＥＭＢＲＡＰＡが行うこととなった。

その後、日本側及びブラジル側からそれぞれ意見及び印象の表明があった。概要は次のとおり。

高多団長より、ブラジルにおいての調査活動に対してブラジル政府側のとられた便宜供与及び対応の仕方、特にCNPHの所長はじめ皆様は土曜日も早朝から夕刻まで対応して頂いたことに対して深く感謝の意を示し、その後、公電案に沿って①調査の概要、②現地野菜生産農家の印象、③野菜研究協力の重要性とその対象をＣＮＰＨとする理由、④本件協力に対するブラジル側の姿勢について述べ、日本側としてもできる限りの協力を行いたいと考えており、日本に帰っても正確にこの状況を伝えたいと述べた。

ブラジル側からは感謝の言葉と共に、①本件協力に日本を選んだのは、野菜研究の分野では技術水準及び日系農家による野菜生産の実績等から日本が最も優れていると考えたこと、②国内的に本件協力の重要性、緊急性が高まってきていること、③全ての関係機関が協力の成功を期待していること、④できるだけ早く協力が開始されるよう努力してほしいこと、⑤本件協力を通じ野菜生産農家の大半をしめる日系人社会にも良い結果を示すことができることであると述べた。

3. 補足取極基本形式

(Draft)

(Japanese Note)

Exellency,

I have the honour to refer to the Basic Agreement on Technical Co-operation between the Government of Japan and the Government of the Federative Republic of Brazil, signed at Brazilia, September 22, 1970 (hereinafter referred to as "the Basic Agreement"), and to the recent discussions held between the representatives of the two Governments concerning Japanese technical co-operation for the implementation of ..... (hereinafter referred to as "the Project"), and to propose, on behalf of the Government of Japan, pursuant to the provisions of Article II of the Basic Agreement, the following arrangements:

1. (1) The Government of Japan and the Government of the Federative Republic of Brazil will co-operate with each other in implementing the Project for the purpose of .....
.....
.....

(2) The Project will be implemented in accordance with the basic plan as stipulated in 1. of the Annex.

2. The Government of Japan will, in accordance with the laws and regulations in force in Japan, take necessary measures, through the Japan International Cooperation Agency which is the executing agency for technical co-operation by the Government of Japan.

(a) to provide, at its own expense, the services of Japanese experts as listed in 2. of the Annex;

(b) to provide, at its own expense, the equipment, machinery and materials as may be agreed upon between the authorities concerned of the two Governments within the scope set forth in 3. of the Annex; and

(c) to receive Brazilian experts engaged in the Project for training in Japan, the fields of which will be agreed upon between the authorities concerned of the two Governments within the scope set forth in 4. of the Annex.

3. The provisions of the Basic Agreement will apply to the Japanese experts, the equipment, machinery and materials referred to in paragraph 2. above as well as the techniques and knowledge acquired by the Brazilian experts to the extent that they are relevant.

4. ..... (hereinafter referred to as "the Executing Institution") will be responsible for the administration and implementation of the Project and Japanese experts will provide guidance and advice on technical matters necessary for the implementation of the Project.

5. The Government of the Federative Republic of Brazil will take necessary measures, through the Executing Institution:

   (a) to provide, at its own expense, the services of Brazilian experts and other personnel necessary for the implementation of the Project, as listed in 5. of the Annex;

   (b) to provide, at its own expense, land, buildings and facilities necessary for the implementation of the Project, as listed in 6. of the Annex;

   (c) to provide, at its own expense, equipment, machinery, vehicles, instruments, tools and other materials necessary for the implementation of the Project other than those provided by the Government of Japan under sub-paragraph (b) of paragraph 2; and

   (d) to meet all running expenses necessary for the implementation of the Project, including those necessary for the installation, operation and maintenance of the equipment, machinery and materials provided under sub-paragraph (b) of paragraph 2.

6. For the effective implementation of the Project, a Joint Steering Meeting, consisting of the members as listed in 7. of the Annex, will be held at least once a year. The Meeting will formulate details of the basic plan of the Project. The details of the basic plan and the annual operational work plan will be submitted to the authorities concerned of the two Government for their approval.

7. The two Governments will consult with each other in respect of any matter that may arise from or in connection with the present arrangements.

I have further the honour to propose that this Note and Your Excellency's Note in reply confirming on behalf of the Government of the Federative Republic of Brazil the foregoing arrangements shall be regarded as constituting an agreement between the two Governments, which will enter into force on the date of Your Excellency's reply and will remain in force until ....., unless either Government has given to the other Government at least six months' written advance notice of its intention to terminate the agreement.

I avail myself of this opportunity to renew to Your Excellency the assurance of my highest consideration.

Annex

1. Basic Plan of the Project

(1) The Project will be implemented in the fields of .....
.....
with a view to contributing .....
.....

(2) The Project will consist of the following activities:

a. Research work in the fields of .....
.....

b. Development of research capabilities of .....
.....

c. .....
.....

d. Other activities to be agreed upon between the authorities concerned of the two Governments.

(3) The activities mentioned in (2) above will be conducted at .....
.....

2. List of Japanese Experts

Category	Field
(1) Leader	
(2) Experts	
(3) Coordinater	
(4)	

3. List of Equipment, Machinery and Materials

(1) .....

(2) .....

4. Fields of Training in Japan for Brazilian Experts

5. List of Brazilian Experts and other Personnel

Category	Field
(1) Leader	
(2) Counterpart experts	
(3) Clerical and service personnel	
(4)	

8. List of Land, Buildings and Facilities

(1) Offices for Japanese experts

(2) .....

7. Composition of the Joint Steering Meeting

(1) Chairman

(2) Japanese side

a. Leader of Japanese experts

b. Representative of Japanese experts

c. Representative of the Japan International Cooperation Agency

(3) Brazilian side

a. .....

b. .....

c. .....

(4) Observers

The following may attend the Meeting as observers:

a. .....

b. .....

c. .....

(Draft)

(Brazilian Note)

Excellency,

I have the honour to acknowledge the receipt of Your Excellency's Note of today's date, which reads as follows:

"(Japanese Note)"

I have further the honour to confirm on behalf of the Government of the Federative Republic of Brazil the foregoing arrangements and to agree that Your Excellency's Note and this Note shall be regarded as constituting an agreement between the two Governments, which will enter into force on the date of this reply and will remain in force until ....., unless either Government at least six months' written advance notice of its intention to terminate the agreement.

I avail myself of this opportunity to renew to Your Excellency the assurance of my highest consideration.

4. １９８１年２月２５日付け要請書（抄訳）

1 （タイトル）野菜栽培研究

2 （部　　門）農　業

3 （地　　域）全　国

4 （期　　間）5年間（１９８２年～１９８７年）

5 （実施機関）ブラジル農牧研究公社

ブラジリア研究実施機関（責任者 Flavio Augusto D' Azaujo Couto）

6 （調整機関）農務省国際局

7 （協力要請先）ＪＩＣＡ

8 （プロジェクト推定費用）

要請先　　3,２００,０００米ドル

要請機関　　１８５００,０００　〃

その他援助資金（POLOCENTRO）　５５００００米ドル

〃　　（FIPEC）　　２００,０００　〃

9 （要請機関の性格）ブラジリア地域研究実施機関（ＵＥＰＡＥ／ＢＳＢ）はブラジル農牧研究公社により１９７５年に設置され首都ブラジリア中心部より４０キロの地点に在る。公社は野菜部門の大きな需要に鑑み同機関を野菜農業研究の全国的機関とし、連邦１８州に３１８件の研究プロジェクトを有する全国野菜類研究プログラムを所掌することとなった。同機関は現在３７人の技術者を擁する。同研究員達の主力は土壌分野－植物栄養、植物病理、栽培、灌漑に注がれている。

同機関の設備次の通り：

総　面　積　　９００ha

灌漑システム　　１１５ha

施設建設面積　　０８ha

10 （プロジェクトの意義）

４１種の植物中の２００種が野菜と考慮されている。ブラジルでは７０余種が生産消費されているがその経済価値は生産地域と住民により異なる。

消費については南部が年一人８７７Kg、東北が３６４Kgで、ブラジル一般平均消費量が年一人５７.７Kgと'77年の統計が示しており、'78年における中央市場扱い量は３００万トンを超すに到った。

また貿易面では１２百万ドルの輸出５９.４百万ドルの輸入を'78年度に示した。

従来ブラジルの野菜栽培は多量の肥料、農薬を用いて行なわれてきており、これを国内で入手容易な天然、有機肥料の加入を高め合理化を計る必要がある。また、適作品種改良も重要な課

題となっている。

日本は限られた国土の中で、小面積の土地に優良な作物を多量に生産するため同部門の特殊の技術を開発しており、ブラジル野菜栽培における日系人の伝統、日本の同分野の高度の技術を考慮し、本件日伯協力は当国野菜栽培に大きな進展をもたらすことが期待される。

11 （プロジェクトの目的と目標）

A) 目　的

(a)ブラジリア研究実施機関（ＵＥＰＡＥ）に研究室及び試験場の整備に必要な科学的手段を与える。

(b)全国野菜研究プログラムへの直接的特定の補佐。

(c)野菜分野のブラジル人研究員研修により協定終了後の技術達成プロセスの継続を可能ならしめる。

(d)野菜生産においてブラジルを自足させ、供給を安定させ、余剰分を輸出する。

B) 目　標

(a) 種々の土壌・気候条件に対し生産性の高い作物を開発し、ブラジルにおける栽培種の品種改良を進める。

(b) 野菜種生産増加を計り、輸入を代替させ、将来輸出の可能性をつくる。

(c) 肥料の合理的使用と節減を国内資源の利用により計る。

(d) 病害虫、雑草除去の技術を進め、農薬の使用を減じ、作物及び生物学的抵抗の利用を高める。

(e) 野菜の機械化、灌漑分野の諸問題に特定の援助を与える。

(f) 野菜産業化技術を進め、目的のための特定作物をつくる。

(g) 生の野菜の貯蔵・保存を可能にする簡易な解決法の提案。

(h) 生産費節減のための野菜栽培管理技術の確立。

(i) ブラジル各地方の土壌、気候条件を調査し全国的野菜生産区画の示唆を行う。

(j) 国内生産を充実させ、にんにく、馬鈴薯、玉葱の輸入を代替する。

(k) 生産倍増を計り、輸出余力をつくる。

(l) 年間一人消費量の５７.７kgを１００kgに高める。

12 （プロジェクト実施方法）

プロジェクトの実施は既に日本よりの機材、専門家を受入れるための装備された研究室と事務所を備えるブラジリアＵＥＰＡＥを中心となり行われる。しかし、その活動は野菜研究の補佐を要するブラジル諸地方に拡大する。

器材は全国野菜研究プログラムに関係するその他の機関にも、ブラジリアより種々必要な分析・調査に赴く研究員を通じ利用される。プロジェクトが更に進んだ段階では各州研究公社も器材と補佐を受ける。

プロジェクトに参加を招へいされている日本人専門家は全国野菜研究プログラムにより設定された優先内でブラジル専門家と共に密接な関係を保ち作業を行う。プロジェクト実施中に生じた発見、その発表は常に協力研究員間での共同作品とする。

プロジェクト実施参加中に実行されることになる各専門家別作業プログラムが設定される。定期的にプロジェクト実行評価会議を行い、得られた結果を分析し、また実行改善のための変更提議があれば考慮される。ブラジル人専門家の短期訪日研修はプロジェクト初年度に策定される計画表と優先度に従う。

日伯双方専門家はブラジルにおける野菜生産システム改良を目的とする会議、シンポジューム、普及員の研修に参加し、専門関係問題についての公表を準備する。

13 （技術協力要請）

a) 専門家

長期（５年）

土壌・作物分析	１名
Cucurbitáceas 種改良	１〃
Crucíferas 種改良	１〃
機械化専門家	１〃
ビールス学	１〃
栽　培	１〃
昆　虫	１〃

短期（２～６ケ月）

昆　虫	２名
細　菌	１〃
栽　培	２〃
水栽培	１〃
野菜栄養	２〃
人参改良	１〃
甘藷改良	１〃
ネマトーダ	２〃
ウイルス	２〃
灌　漑	２〃
殺虫剤	２〃
機械化	２〃
種子生産	２〃

b) 研　修

年間研修員８名、管理職２名の短期研修。

c) 機　材（別添リストに依る。国産類似品なし。）

（別添） 要請機材リスト

ITEM	ESPECIFICAÇÃO	FABRICANTE	UNID.	QUANT.	VALOR UNIT ¥	VALOR TOTAL
1	Testador de amido	KIYA	U	01	60,000	60,000
2	Microscópio invertido modeo MTD	NIKON	U	01	300,000	300,000
	Objectivás LWD 40X	"				
	Ocular HKW 15X	"				
	Condensador de 12 mm	"				
3	Equipamento para fotomicrofotografia PFM	"		01	30,000	30,000
4	Máquina fotográfica para equipamento PFM	"		01	60,000	60,000
5	Microscópio Estereoscópio medelo SMZ-2	"	U	05	400,000	2,000,000
	Oculares 15x e 20x	"				
	Objetivas auxiliares Al-5, Al-7, Al-15	"				
6	Iluminador SM	"		02	15,000	30,000
7	Base diascópia para modelo SMZ-2	"		02	10,000	20,000
8	Circular floating stage	"		02	5,000	10,000
9	Equipamento microflex AFM para fotografia	"		03	30,000	90,000
10	Máquina fotográfica para equipamento AFM			02	60,000	120,000
11	Microscópio Biophot	NIKON	U	02	500,000	1,000,000
	braço modelo VBS-BS					
	Base modelo VBS					
	objetivas CF 10x - 20x - 40x - 100x com diafragma IRIS					
	objetivas CF DLL 20x - 40x - 100x					
	objetivas CF DM 40x - 100x					
	objetivas CF BM 20x - 40x - 100x					
	oculares CFW 10x - 15x					
	CFUW 10x	NIKON				
	CF Photo 5x - 10x					
	Condensadores UW dark field					
	Swingont	NIKON				
	Achromatic/aplanatic					
	turret para contraste de fase					
12	Equipamento para fotomicrografia modelo HFM	NIKON	U	02		
13	M 35 FA dark box	"	U	02		
14	Protection screen para microscópio Biophot c/HFM	"	U	02		

ITEM	ESPECIFICAÇAO	FABRICANTE	UNID.	QUANT.	VALOR UNIT ¥	VALOR TOTAL
15	Double camera head para Biophot HFM	NIKON	U	02		
16	Máquina fotográfica para microscópia Biophot	"	U	03		
17	Balança analítica SDT-200	IKEDA RIKA	U	02	360,000	720,000
18	Asseptic box modelo P-70	"	U	02	120,000	240,000
19	Clean bench CCV - 800 EC	"	U	02	1,170,000	2,340,000
20	Turntable RT-2	"	U	02	630,000	1,260,000
21	Constant wather bath R-28	"	U	03	1,080,000	3,240,000
22	Thermostatic culture shaker SA-12	"	U	02	2,420,000	7,260,000
23	Vidros cód. 223885 de 12 ml	Wheaton	U	500		
	24 ml	"	U	200		
24	Agitador para tubos (automatic-Labonixer) cód. nº 1-1060	IUCHI	U	01	28,000	28,000
25	Agitador de placas - cód. 1-1181	"	U	01	65,000	65,000
26	Recipiente para gelo, cód. nº 1-1096	"	U	01	30,000	30,000
27	Manta aquecedora para 1000 ml cód. 1-1098	"	U	02	2 28,600	57,200
	2000 ml cód. 1-1098	"	U	02	33,000	66,000
28	Mesa agitadora cód. 1-1071	"	U	02	195,000	390,000
29	Aquecedor elétrico - cód. 1-1117	"	U	02	7,000	14,000
30	Cronômetro HEVER - cód. 1-1168	"	U	02	9,600	19,200
31	Lavador de pipetaa cód. 2-1014 AB-1	"	U	02	16,000	32,000
32	Lavador de tubos - TS-200, cod. 2-1022	"	U	01	65,000	65,000
33	Câmera fotográfica 35 mm com acessórios	NIKON	1	01	150,000	150,000
34	Incubadora para criação de insetos com acessórios	KIYA	1	03	400,000	1,200,000
35	Câmara climática Phytotron Model HP 600	IKEDA-RIKA	1	02	1,300,000	2,600,000
36	Balança de Leitura Direta P-10 com acessórios	METTLER	1	02	585,000	1,170,000
37	Balanca Digital P-1210	"	1	01	432,000	432,000
38	Pulverizador com acessórios	IKEDA-RIKA	1		4,000,000	4,000,000
39	Armadilha luminosa com acessórios	"	1	01	580,000	580,000
40	Microaplicador de inseticidas com seringes e acessórios	KIYA	Jogo	02	30,000	60,000
41	Inoculation Box HT-2	IKEDA RIKA	U	02	990,000	1,980,000
42	Coletor de esporos SI-BT-1	"	U	02	109,000	218,000
43	Automatic Atonizins Inoculation Equipment MK-II	"	U	01	650,000	650,000
44	Carro metálico SC-M-4	"	U	02	86,700	173,400

ITEM	ESPECIFICAÇAO	FABRICANTE	UNID.	QUANT.	VALOR UNIT ¥	VALOR TOTAL
45	Centrífuga 05P-21 completa	IKEDA RIKA	U	01	170,000	170,000
46	Centrífuga 90 D-3 completa	"	U	01	391,000	391,000
47	Low temperature water bath 7537-SP	"	U	01	430,000	430,000
48	Thermo-hygrostat GL-82	"	U	02	2,420,000	4,840,000
49	Low temperature BOD Incubator no. 14-98 - 10-50°C	MRK	U	03		
50	Rotary Vacuum Pump 15-30	MRK	U	01		
51	Magnetic Stirrer IS-36	IKEDA RIKA	U	03	27,800	83,400
52	Pearlcorder SR 501 (com 4 fitas e 2 baterias)	OLYMPUS	U	91	48,800	48,800
53	Garrafa para meio de cultura marca WHEATOH					
	Catálogo no. 219757 (250 ml)	WHEATON	CASE	02	34,600	69,200
	219759 (500 ml)	"	"	02	25,900	51,800
	219760 (1000 ml)	"	"	02	36,300	72,600
54	VIALS - Catálogo no. 224885 (12 ml)	"	"	03	11,300	33,900
	224888 (24 ml)	"	"	04	18,400	73,600
55	Flume Parshall e Registrador	OOYA	U	10	174,900	1,749,000
	1 - Jogo modelo nº APF - 103 3"		U	06		
	2 - Jogo modelo nº APF - 106 6"		U	03		
	3 - Jogo modelo nº APF - 109 9"		U	02		
	4 - Jogo modelo nº APF - 110 1"		U	01		
	Registrador					
	2a. Medidor de fluxo de água "Flume"					
	1. Jogo modelo nº PF - 2 2"		U	02		
	2. Jogo modelo nº PF - 3 3"		U	02		
	3. Jogo modelo nº PF - 5 5"		U	02		
	4. Jogo modelo nº PF - 6 6"		U	02		
	5. Jogo modelo nº PF - 9 9"		U	02		
	2b. Jogo de sistema gráfico (mecanismo c/ajuste para 1 ou 7 dias)		U	10		
	° Papel para 7 dias - 55 folhas					
	° Caneta - 2 v					
	° Tinta - 2 v					

ITEM	ESPECIFICAÇÃO	FABRICANTE	UNID.	QUANT.	VALOR UNIT ¥	VALOR TOTAL
56	Enemômetro A - 100	NAKA-ASA SOKKI	U	02	273,000	546,000
57	Anemômetro portátil modelo 1421	TAMAYA	U	02	100,000	200,000
58	Termógrafo de solo - modelo 1123 (com acessórios)	"	U	06	80,000	480,000
59	Tanque de evaporação - modelo 1320	"	U	10	30,000	300,000
60	Trena (100, 50 e 30 - 6 unidi de cada)	YWAMOTO SHOJI	U	18	126,500	2,277,000
61	Bomba de vácuo de operação manual - modelo NP-U	SIBATA	U	03	13,500	40,500
62	Equipamento de controle automático de irrigação em estufa modelo ASD-5 nº 43-061165	IKEDA RIKA	U	08	140,000	1,120,000
63	Nível manual tipo vara nº 38	"	U	02	2,200	4,400
64	Nível manual tipo esquadro nº 40	"	U	02	4,300	8,600
65	Clinômetro nº 46	"	U	03	6,000	18,000
66	Aparelho para determinação de umidade do solo - 73	"	U	02	80,000	160,000
67	Tabela para medir cor de folhas SF - 200	"	U	01	13,000	13,000
68	Medidor da qualidade da água p/irrigação SF-22	"	U	02	21,000	42,000
69	Trados para solo - SF - 41	"	U	02	14,000	28,000
70	Trados para solo - SF - 42	"	U	02	14,000	28,000
71	Trados para solo - SF - 422	"	U	02	11,000	22,000
72	Medidor de salinidade do solo SM-37	"	U	02	32,000	64,000
73	Registrador automático flume medidor do fluxo de água	OOYA	U	02	1,693,700	3,387,400
74	Aparelho para determinação de umidade do solo F-2A (infravermelho)	IKEDA RIKA	U	02	115,000	230,000
75	Caixa de medidor de umidade ST-03C com jogos de sensores tipo lâminas 80F	KYOKUTO BOOETI	U	02	1,400,000	2,800,000
76	Tensiômetro de solo, tipo terade - nº 345 - mod. S-1 (20 cm)	KIYA	U	200	12,000	2,400,000
	S-2 (40 cm)		U	100	14,000	1,400,000
	M (80 cm)		U	50	16,000	800,000
	L (150 cm)	KIYA	U	50	20,000	1,000,000
77	Tensiômetro de solo S-7 (30 cm)	IKEDA RIKA	U	100	8,300	830,000
78	Medidor da taxa de diluição de fertilizante líquido mod. DM-33 nº 377-B	KIYA	U	01		
79	Varas de perfuração para amostragem de solo - nº 300	"	U	02	15,000	30,000
	nº 300-B	"	U	02	15,000	30,000
80	Penetrometros de solo, yamanaka, tipo "standard" - nº 351	"	U	02	40,000	80,000

ITEM	ESPECIFICAÇÃO	FABRICANTE	UNID.	QUANT.	VALOR UNIT ¥	VALOR TOTAL
81	Medidor de densidade aparente do solo - yamanaka com acessórios padrão - nº 330	KIYA	U	10	15,000	150,000
82	Cronômetro	SEIKO	U	03	13,000	39,000
83	Controle automatigo de aspersao - DM 204 - nº 345-D	KIYA	U	02	300,000	600,000
84	Tensiômetro de solo "Air pool System" - nº 345-E - 10 cm	"	U	50	15,000	750,000
	- 20 cm	"	U	100	17,000	1,700,000
	- 40 cm	"	U	100	20,000	2,000,000
85	Tensiômetro registrador modelo V-3 - nº 345-F	"	U	02		
86	Aparelho para medir potencial de água na planta DIK-PC-40, tipo câmera de pressão com acessórios	DAIKI RIKA	U	01	460,000	460,000
87	Medidor de umidade do solo com raios infravermelhos RKI-6121, F-24	IKEMOTO RIKA	U	01	118,000	118,000
88	Divisor de amostra de sementes - 103-B cat. nº 8	KM-KIYA'S	U	01	240,000	240,000
89	Amostra de semente, tipo redondo - 105	"	U	05	10,000	50,000
90	Panela de amostra de semente, 105-b	"	U	03	3,000	9,000
91	Amostrador de semente, tipo Noble 101	"	U	03	8,000	24,000
92	Conjunto de peneiras - 106	"	U	02	42,000	84,000
93	Conjunto de peneiras - 107	"	U	01	42,000	42,000
94	Conjunto de peneiras p/soja - 110	"	U	02	160,000	320,000
95	Germinador termostático - 112°C	"	U	02	600,000	1,200,000
96	Kiya testador de dureza 1,600 - cat. nº 5	"	U	02	25,000	50,000
97	Estufa de secagem rotativa - 143-C	"	U	01	12,000	12,000
98	Instrumentos para cruzamentos - 163	"	U	03	1,200	2,400
99	Debulhador de semente Model TSL	"	U	02	50,000	100,000
100	Balança automática - 1019 - A cat. nº 5	"	U	02	900,000	1,800,000
101	Balança de braço duplo - 1041 - A	"	U	01	36,000	36,000
102	Balança de braço duplo - 1041 - C	"	U	01	36,000	36,000
103	Máquina de colheita de experimentos Japanase Agricultural Machinery catalogue 79 - HH 450	KUBOTA	U	01	240,000	240,000
104	Secador de grãos - Model KDR 1004 - Japanese Agric. Machinery Cat. 79	"	U	01	380,000	380,000
105	Máquina de limpeza - B-1 II Japanese Agric. Mach. Cat. 79	HARADA	U	01	320,000	320,000
106	Secador de grãos - SP-91 A - Jap. Agric. Mach. Cat. 79	ISSHINGO	U	01	420,000	420,000

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107	Trilhadeira ISEKI D100 - Jap. Agric. Mach. Cat. 79	ISEKI	U	01	240,000	240,000
108	Microscópio estereoscópio modelo ZOOM SZ-II	IKD	jogo	01	142,000	142,000
109	Medidor de óleo portátil modelo DOC - 100	SHIMADZU	U	02	15,000	30,000
110	Medidor de compensação tipo CT	"	U	02	115,000	230,000
111	Medidor de torção - Tipo CT	"	U	02	115,000	115,000
112	Controlador de tempo programado modelo D-5-11	"	jogo	03	50,000	150,000
113	Aspirador modelo A-2	EYELA	"	01	159,000	159,000
114	Medidor de compressao e torção simultâneo tipo CC	SHIMADZU	"	01	59,000	59,000
115	Termoregulador modelo T-80	EYELA	"	01	67,000	67,000
116	Refratômetro manual de açucar modelo 2005-A	KM-KIYA	"	02	25,000	50,000
117	Extrator de raízes de plantas método "Monolith" mod. 161 com 92 tanabgis	"	"	04	80,000	320,000
118	Testador de dureza de frutos, tipo universal	"	U	02	25,000	50,000
119	Câmaras de crescimento vegetal modelo NQ-C045 - 960 C4S	"	jogo	02	1,500,000	3,000,000
120	Colorímetro fotoelétrico modelo 2532-CE-5	IRK	U	01	125,000	125,000
121	Misturador de solo 250L	"	jogo	01	550,000	550,000
122	Lupa bilocular modelo SZ-tr	OLYMPUS	jogo	01	550,000	550,000
123	Tabela para medir cores - modelo SF-200	IKEDA	"	02	6,000	12,000
124	Balança analítica Jipitor Direct Reading Balance, mod. C 3	IKEDA RIKA		01	350,000	350,000
125	Balança analítica One Pan Type - mod. PT-3 1200D	"		01	250,000	250,000
126	Banho Maria - Kiya - 3420-B MRK-1365	KIYA				
127	Câmara climática - mod. MP-800 c/acessórios stabdard a acessórios especiais p/5 anos	IKEDA RIKA		01	1,300,000	1,300,000
128	Estufa automática - mod. YR - 120	IKEDA RIKA	jogo	02	940,000	1,880,000
129	Autoclave mod. HA-30 c/acessórios standard	HIPAYAMA		01	350,000	350,000
130	Ultracentrífuga mod. 80 P-7 c/acessórios standard, rotor e tubos	HITACHI		01	6,000,000	6,000,000
131	Aparelho para produzir antisoro c/acessórios standard e especinis	IKEDA RIKA		01	270,000	270,000
132	Parafilm - cód. nº 5-0502	IKD (I)	pct	10	10 4,200	4,200
133	Piceta de plástico (1 L) cod, nº 1-0145	IKD	garrafa	03	210	630
134	Bomba manual - cód, nº 1-0151	"	"	03	800	2,400
135	Placa de petri de plástico	"	placa	2000	26	52,000
136	Medidor de acidez modelo HM 5BS (GCT 155C) c/acessórios standard	TOOADENPA	jogo	01	150,000	150,000

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137	Equipamento de distilaçaõ P-36-OS com acessórios standard	SHGIYA MAGEN	jogo	01	826,000	826,000
138	Recipiente para H20 de 5 litros - cód. nº G-1019	IUGHI	U	01	1,500	1,500
139	Conjunto de bisturi e lâmina cód. nº TK-66 (8 - 1076)	"	U	01	1,400	1,400
140	Congelador a baixa temperatura c/acessórios; 800 x 382 x 1,800 mm IKEDA MDF-400 Cepa 420L + 20°C - 40°C	IKEDA MDF-400	U	01	688,000	688,000
141	UV-VIS Recording Spectrophotometer VV-350 c/acessórios completo	SHIMADZU	U	01	2,400,000	2,400,000
142	Centrífuga refrigerado modelo 20PR-5 c/motor e acessórios A-B-C	HITACHI	U	01	3,600,000	3,600,000
143	Medidor de taxa de difusão de oxigênio (OX-IA) nº 344-B	KIYA	U	01	390,000	390,000
144	Triturador de solo SC-350	IKEDA RIKA	U	01	550,000	550,000
145	Misturador de solo - nº 317	KIYA	U	01	550,000	550,000
146	Aparelho de preparo de amostra de solo - nº 318	"	U	01	830,000	830,000
147	Aparelho de membrana p/determinação da água no solo DIK-320	IKEDA RIKA	U	01	680,000	680,000
148	Jogo de pratos de cerâmica p/panela de pressão DIK-350	"	U	02	690,000	690,000
149	Estufa automática, tipo digital modelo SS-206D	"	U	01	340,000	340,000
150	Piscela nº 7-1019 (100 ml, 250 ml e 500 ml - 5 unid. de cada)	IUGHI	U	15	6,333	95,000
151	Medidor magnético	TOKIO RIKAKIKAI	U	02	93,000	186,000
152	Carrinho com rodas e três bandejas nº 7-0702	IKEDA RIKA	U	02	34,000	68,000
153	Agitador para análise mecânica nº 702 com copo	KIYA	U	02	15,000	30,000
154	Hidrômetro de Boyocos com jarra e banho de água nº 703, nº 704 e nº 705	"	U	02	20,000	40,000
155	Banho Maria a temperatura constante	IKEDA RIKA 35255	U	01	164,000	164,000
156	Aparelho p/destilação automática Tooyo RD-120K	"	U	01	1,152,000	1,152,000
157	Balança de leitura direta p/apálise química	SARTORIOUS 2472	U	01	600,000	600,000
158	Balança de leitura direta	METLER E - 20	U	02	675,000	1,350,000
159	Balança SD-20 nº 5-1090 (20 kg)	IUCHI	U	02	13,500	27,000
160	Aparelho de membrana de pressão (c/acessórios opcionais)	KIYA nº 356-B	U	02	750,000	1,500,000
	° Filme semi-transparente	DIK-321	dz	10	6,900	6,900
161	Aparelho de pressão c/prato de cerâmica porosa (c/acessórios e partes opcionais) DIK - 350	DAIKI RIKA	"	03	780,000	2,340,000
162	Aparelho de sedimentação de solo (c/partes opcionais)	KIYA nº 326	"	04	92,000	318,000
	° garrafas de dispersão p/análise de pipeta, tippo Kohn		"	10	2,875	28,750
	° agitador para análise de pipeta DIK-730		"	06	304,750	1,828,500

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163	Registrador de sedimentação modelo SR-1000 (c/acessórios)	SHIMADZU CE-50	dz	02	1,400,000	2,800,000
164	Aparelho p/análise de agregados do solo - mod. nº 3	KIYA nº 348	"	02	339,000	678,000
165	Jogo de peneira de bronze nº 18-40 (c/acessórios padrão)		"	04	14,000	64,000
166	Picnômetro para solos mod. 100 (c/partes opcionais)	KIYA nº 331	"	04	333,500	1,334,000
	• amostradores p/picnômetros de solo mod. DIK-120		"	05	28,750	143,750
	• " " " mod. DIK-110		"	200	1,035	107,000
	• tubos de aco inoxidável p/picnômetro (100 ml) DIK-111		"	50	2,875	143,750
	• acessórios para picnômetro (1 m) - DIK - 130		"	02	40,250	80,000
167	Jogo de pas para estudo de solo - mod. DIK-159	DAIKI RIKA	U	02	13,800	27,600
168	Aparelho p/medição do potencial matricial mod. TG c/acessórios especiais.	IKEDA RIKA	U	02	580,000	1,160,000
	• bomba de vácuo p/medição do potencial matricial		U	01	50,000	50,000
169	Espectrofotometro digital c/acessórios "standard" mod. 205D, incluindo: impressor digital, 15 rolos de papel impressor, compressor de ar silencioso SC-2, boma vazia	HITACHI	jogo	02	2,057,250	4,114,500
170	Centrífuga refrigerada mod. 20PR-5 c/rotor e acessórios, A-B-C		peça	01	1,800,000	1,800,000
171	Moinho de esferas rotatorias KIYA nº 4204, Tipo Universal com partes opcionais	KIYA	jogo	01	210,000	210,000
172	Espectrofotometro SHIMADZU UV-V15- mode, UV-210A c/acessórios	SHIMADZU	jogo	02	2,400,000	4,800,000
173	Agitador magnético MRK nº 14-13	MITAMURA	jogo	04	12,100	48,400
174	Agitador magnético MRK de temperatura variável, mod. nº 14-20	"	"	04	38,000	152,000
175	Estufa automática modelo YK-120	IKEDA	"	02	940,000	1,880,000
176	Condutivimetro para solução do solo mod. CM-15A c/CG-2001PL e acessórios		"	01	330,000	330,000
177	Absorção atômica e espectro fotometro de chama mod. AA-640-12 e acessórios (SHIMADZU SCIENTIFIC INSTRUMENTS & EQUIPMENT CA 006-002. og 58)	SHIMADZU	jogo	01	3,800,000	3,800,000
178	Vasos "WAGNE" nº 6172 com acessórios		"	400	1,498	596,000
179	Suporte ajustável SJ-15 Cat. nº 851701	YAMATO	peça	05	7,000	35,000
180	Balanca eletrônica mettoler, mod. PC 440 cat. nº 7901-91	SIBATA	peça	02	320,000	640,000
181	Balança eletrônica mettoler, mod. 4400. Cat. nº 7901-92	SIBATA	"	02	350,000	700,000
182	Forno de mufla AMFA-15, Cat. nº 174515	MITAMURA	"	02	360,000	720,000

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183	Evaporador rotativo "MINI"	IKEDA RIKA	peça	02	85,000	170,000
184	Aparelho automático de diluição, mod. 2110, d/acessórios padrões e transformador regulável	YAMATO	jogo	01	400,000	400,000
185	Medidor de intensidade luminosa p/horticultura, mod. DM-28	KIYA	"	01	17,000	17,000
186	Perfurador de folhas, tipo redondo	"	"	02	30,000	60,000
187	Triturador de solos - SC-350	"	"	01	550,000	550,000
188	Misturador de solos, IKEDA, Cat. nº 317	"	"	01	550,000	550,000
189	Aparelho p/preparo de amostras de solo, KIYA 318	"	"	01	830,000	830,000
190	Medidor de umidade do solo com raios infravermelhos, mod. F-2 Cat. 1901	"	"	01	118,000	118,000
191	Vaso tipo neubaver, mod. 380	"	peça	100	400	40,000
192	Medidor de pH, digital mod. 671 c/acessórios, cat. nº 7051-07	SIBATA	jogo	02	150,000	300,000
193	Centrífuga marusan - mod. 90H-2	MARUSAN	"	02	150,000	300,000
194	Bomba de vácuo, mod. SS-50	IKEDA	jogo	02	190,000	380,000
195	Fotometro de chama digital, com registrador, mod. 205-DT	IKEDA	"	01	2,260,000	2,260,000
196	Aparelho manometrico de Warbury mod. MD-15 c/acessórios especiais e standard	IKEDA RIKA		01	1,600,000	1,600,000
197	Câmara climática modelo MP-3-0 c/acessórios standard e especiais (para 5 anos)	"		06	1,300,000	7,800,000
	- V-29 hyto tron Model: MP-800			06		
	- V-29 panel			06		
	- V-29 shelf			06		
	- V-29 thermometer			06		
	transformer			06		
	Five years portion			06		
	- V-29 refrigerat e now window case			06		
198	Desidratador por congelamento 220V MRK nº 4-80 (Vacuum Freezing & Duying Operatus MRK 90 with standard accessiories)			01	1,300,000	1,300,000
199	Termostato 0,5°C 2 a 43°C (liquid expansion model)	IKO	U	20	8,000	160,000
200	Bomba peristaltica modelo MB-1001 10 x 80 - 280 jl/h	TOKYO RIKAKIKAI CO	U	02	193,000	386,000
201	Banho com agitação modelo SS-820	"	U	02	131,600	263,200
202	SHAKER modelo SS-81P	"	U	02	110,200	220,400

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203	Espectrofotometro de absorção atômica AA-782		U	01	432,000	432,000
204	Balança digital Mettler P - 1210		U	01	445,000	445,000
205	Válvula de agulha, modelo 1511 - 508	SIBATA CHEMICAL	U	10	5,800	58,000
	1511 - 510	HPP MFG CO	U	10	6,000	60,000
	1511 - 513	"	U	10	7, 7,500	75,000
206	Cromotografia da capa fina HA-20 c/acessórios standard e especiais	TOYO KAGAKU	1 conj.	01	282,000	282,000
207	Aparelho para eletrofone c/papel de filtro PE-2 c/acessórios standard e especiais	"	"	01	200,000	200,000
208	Ultracentrifuga modelo 55P.6 c/acessorios standard e especiais incluindo: Rotores V-21 RP 50 T V-21 RP 55 T V-21 RP 30-2 V-21 RPS-50	HITACHI	"	01	6,400,000	6,400,000
209	Penetrometro VA nº 166		U	05	30,900	154,500
210	Jack, para ajustamento vertical		U	10	7,000	70,000
211	Evaporador rotativo modelo 120 B - DW	BUCHI-SIBATA	U	02	220,000	440,000
212	Analisador de gás Orsat - hunge	KOBAYASHI	U	02	75,000	150,000
213	Analisador de gás Orsat - Fisher	"	U	02	65,000	130,000
214	Seringas de Hamilton 1 ml	IUCHI	U	02	24,300	48,600
215	Seringas de Hamilton 5 ml	"	U	02	24,300	48,600
216	Hand tally counter, mod. 4-1038	"	U	03	2,000	6,000
217	Electrothermometre model 1-1162 - 1	"	U	01	18,000	18,000
218	Flear Ice Machine F - 130A	IKD	U	01	468,000	468,000
219	Horticultural Lux Meter, Model DM-28	KIYA	U	02	17,000	34,000
220	Hand sugar Refractometers, Model 2005-A	"	U	02	22,000	44,000
221	HIGRO-Thermographs K-2	IKD	U	02	60,000	120,000
222	Remote recording thermographs K-45	"	U	04	73,000	292,000
223	Miele automatic washing machines G 715	"	U	01	1,950,000	1,950,000
224	Top leading balance, cat. - 63456, PB 3000	SIBER-KIKAI	U	01	450,000	450,000
225	Termometro "standard" mod. LTS-128, c/acessórios standard	TOKYO MONOMI	jogo	03	46,000	138,000

ITEM	ESPECIFICAÇÃO	FABRICANTE	UNID.	QUANT.	VALOR UNIT ¥	VALOR TOTAL
226	Termometro para solos "standard" c/acessórios "standard"					
	modelo WM - 100	WM	jogo	30	1,250	37,500
	WM - 101	"	"	30	1,250	37,500
	WM - 102	"	"	30	1,300	39,000
	WM - 104	"	"	30	1,500	45,000
	WM - 106	"	"	30	1,750	52,000
227	Pluviografo com papel, tinta e caneta p/5 anos de registros	OHTA KEIKI	"	10	390,000	3,900,000
228	Termógrafo modelo WM-114 c/acessórios standard com panel, tinta e caneta para 5 anos de regiatro	"	"	20	19,500	390,000
229	Barômetro aneroide nº 147-341 mod. CN	SHIMADZU RIKA	peças	02	20,000	40,000
230	Medidor de umidade do solo nº 345 - modelo S-1	METER	"	50	12,000	600,000
	S-2	"	"	50	14,000	700,000
	M	"	"	50	16,000	800,000
	L	"	"	50	20,000	1,000,000
231	Evaporímetro n+ 42 c/acessórios standard, tinta, caneta e panel para 5 anos de registro	OHTA KEIKI	"	10	42,000	420,000
232	Actinógrafo tipo "Rolutzch" nº 44 c/acessórios standard papel, tinta e caneta para 5 anos de registro	"	"	03	84,000	252,000
233	Higrógrafo c/acessórios standard, papel, tinta e caneta para 5 anos de registro	TOKYO MOMOKI	jogo	10	21,000	210,000
234	Termografo de solo nº 45 c/acessorios standard, Papel, tinta e caneta para 5 anos de registro	OHTA KEIKI	jogo	40	80,000	3,200,000
235	Sistema de registro agrometeorológico, mod. AMR-10702, consistente de 1. Registrador meteorológico PR1-3	IIO DENKI	"	02		7,961,000
	2. Unidade de temperatura TS-PT	"	"	16		
	3. Unidade integradora de temperatura ST1 - 525	"	"	03		
	4. Unidade de umidade EH-1 - 505	"	"	03		
	5. Unidade integradora de luz solar SR1-532	"	"	03		
	6. Unidade integradora de energia solar SRL-527	"	"	03		
	7. Unidade integradora de composição SRF-461	"	"	03		
	8. Unidade integradora de chuva RP1-534	"	"	03		
	9. Anemoscópio e Anemômetro AP1-534	"	"	02		

ITEM	ESPECIFICAÇÃO	FABRICANTE	UNID.	QUANT.	VALOR UNIT ¥	VALOR TOTAL
	10. Mastro "Panza" PM-6	IIO DENKI	jogo	02		
	11. Telas para instrumentos meteorológicos 1US-2	"	"	02		
	12. Cordões elétricos 100 m	"	"	04		
	13. Unidade de bateria de emergência cap. líquida 3,6 lt.	"	"	03		
	14. Papel e tinta para 5 anos de registro	"	"	03		
	15. Ferramenta "IIO DENKI"	"	"	02		
236	Medidor de densidade de iluminação com acessórios standard	"	"	02	95,000	190,000
237	Medidor de iluminação SP 171	SEISAKU-SHYO	"	02	115,000	230,000
238	Registrador térmico circular ER-688-6 c/acessórios standard	IIO DENKI	"	02	775,000	1,550,000
239	Galvanômetro eletrônico, modelo YEW 2709, completo c/cabos, baterias etc.	YOKOGAWA	U	02	30,000	60,000
240	Potenciômetro de precisão para corrente contínua, mod. YEW 2723 mas os acessórios nº 2742, 2745 e 2744	"	U	02	40,000	80,000
241	Ponte de Wheastone de precisão mod. YED nº 2768, completo com todos os acessórios	"	U	02	40,000	80,000
242	Resistores standard modelo YEW 2792	YEW	U	02	2,000	4,000
243	Resistores de alta precisão standard mod. YEW 2792	"	U	02	2,000	4,000
244	Caixa de resistência tipo "plecade" mod. 2785 YEW	"	U	02	3,000	6,000
245	Caixa de resistência tipo "decade" mod. 2786	"	U	02	3,000	6,000
246	Espectroradiometro de precisão - variação de sensibilidade de 380 - 1350 mm - registro de medição espectral em sistema analógico ou digital programável.			02	50,000	100,000
247	Piranometro espectral de precisão - Eppley ou similar - Registro analógico ou digital; prográmavel			04	10,000	40,000
248	Filtros para pironometro tipo Eppley RG 695 ou adaptável ao modelo e marca do piranometro			05	1,200	6,000
249	Quantum /Radiometro/Fotometro para estudos de atividades fotissintéticas da radiação (PARº e com sensibilidade nas seguintes faixas de ondas: 388 - 780 mm 780 - 105 mm 780 - 2500 mm			02	6,000	12,000

ITEM	ESPECIFICAÇÃO	FABRICANTE	UNID.	QUANT.	VALOR UNIT ¥	VALOR TOTAL
250	Medidor de resistência difusiva do vapor d'água de folhas de plantas com sensores de temperatura e umidade.			02	8,000	16,000
251	Autoporometros			02	8,000	16,000
252	Conjunto de medição de umidade do solo usando por principio "Neutrons Atenuados" composto de sonda e contador			01	100,000	100,000
253	Conjunto portáteis de sensores, para medição de gradiente de temperatura de solo, com respectivo sistema de aquisição de dados, usando cassete e programável.			05	400,000	2,000,000
254	Radiometros liquidos tipo miniatura para estudos de radiação liquida sobre culturas olerícolas no campo, com conveniente sistema de aquisição de dados em formato analógico ou digital programável.			02	400,000	800,000
255	Unidade portáteis para medição de perfil de vento (gradiente) com sistema de aquisição de dados em formato analógico ou digital programável.			01	1,500,000	1,500,000
256	Potenciografos ou fotoregistradores - entrada em mV ou mW - alta precisão - para aferição, calibragem e montagem de equipamentos solarimétricos.			02	160,000	320,000
	Estação agroclimatológica com a seguinte composição: a) torre para medição de gradiente de temperatura do ar, b) torre para medição de gradiente de vanto (direção e velocidade) c) gradiente de umidade do solo, d) gradiente de temperatura de solo (bateria de reosensores) e) gradiente de umidade do solo f) bateria de tanque de evaporação (classe A, canadense etc), com evaporígrafo, compensador e registro de dados em sistema de aquisição de dados de formato analógico ou digital. g) conjunto p/medição de radiação solar, completo (radição global, líquida e difusa). h) Sistema de aquisição de dados multicanal com entrada para todos os equipamentos (sensores) da estação agrometeorológica, com registro de dados em formato analógico/digital e gravação simultanea em cassete e fita de papel com a devida programacão.					

ITEM	ESPECIFICAÇÃO	FABRICANTE	UNID.	QUANT.	VALOR UNIT. ¥	VALOR TOTAL
	i) orvalhógravo					
	j) pluviógrafo					
	k) abrigo meteorológico					
257	Fio constantan números 32 e 36 AWG, fio constantan com isolamento de teflan números 32 e 36 AWG e fio de cobre com isolamento de teflan número 21 AWG			500 m	20,000	20,000
	Tubo de vidro especial para construção de solarímetro			50	3,000	3,000
	Galões de tinta branca especial usada na fabricação de solarímetros			10	300	3,000
	Galões de tinta preta especial usada na fabricação de solarímetros			10	300	3,000
	Conjunto de panelas extratores para 1,5 e 15 bars de pressão, com todos os acessórios complementares, tais como compressores, manifolds membranas, moldes etc.			01	30,000	30,000
	Jogo de retirador de amostra de solo (auger), c/moldes padronizados para determinação de algumas constantes físicas do solo, como por exemplo condutividade hídrica de solos.			01	3,000	3,000
	Permeametro para estudos de infiltração de gás, oxigênio, etc. no solo.			01	6,000	6,000
	Foto tacamento modelo YEW 2607	YEW	U	01	10,000	10,000
258	Luximetro portátil modelo YEW nº 3281, com todos acessórios completos	"	U	06	10,000	60,000
259	Ociloscópio, LBO - 520, 5 mV, 30 MHz, Dualtrace, marca Leader ou simila	LEADERS	U	01	180,000	180,000
260	Ociloscópio marca National, mod. VH-5260A, faixa de frequência 0-10 MHz, sensibilidade de 2 mV/div., duplo traço etc.	NATIONAL	U	01	180,000	180,000
	Analizador de transistores mod. AT-1	"	U	01	18,000	18,000
	Gerador de convergência	"	U	01	6,000	6,000
	Traçador de curvas, testador de transistor, SCR, Trície deodos, F.ET etc. para uso c/ociloscópio	"	U	01	30,000	30,000
261	Multitester, marca "SANWA" modelo EM-800	SANWA	U	02	39,000	78,000
262	Moinho para laboratório W-50	IKEDA RIKA	peça	01	150,000	150,000
263	Agitador magnético, IS3B	"	"	01	210,000	210,000
264	Esterilizador úmido de reta pressão, RKI 1915, KA-4 (K-1599)	IKEMOTO RIKA	jogo	01	1,870,000	1,870,000

ITEM	ESPECIFICAÇÃO	FABRICANTE	UNID.	QUANT.	VALOR UNIT ¥	VALOR TOTAL
265	Contador de colonias com lâmpadas fosforescentes, RKI 2093	IKEMOTO RIKA	jogo	01	48,000	48,000
266	Homogeneizador HI-15	IKEDA RIKA	"	01	110,000	110,000
267	Agitador com aquecimento. nº 14-05	"	"	01	70,000	70,000
268	Bomba de vácuo - tubo nº RP-B1	MITAMURA	"	01	135,000	135,000
269	Bomba de vácuo rotatória cat. nº 15-30	"	"	01	136,000	136,000
270	Medidor de pH ml digital F-766	METLER	"	01	230,000	230,000
271	Termostato cat. nº 13-82		"	01	170,000	70,000
272	Banho maria SWB - 25		peça	01	42,000	42,000
273	Peneiras de teste 25, 60, 140 e 270 masch, 5 de cada		"	20	2,650	53,000
274	Estufa de laboratório MS-45	IKEDA RIKA	"	01	148,000	148,000
275	Lavador de vidraria F-570		jogo	01	1,400,000	1,400,000
276	Banho de temperatura constante com agitador cat. nº 14-70 (CBS-50)		"	01	310,000	310,000
277	Banho maria universal cat. nº 13-80	MITAMURA	"	01	135,000	135,000
278	Incubador p/cultivos c/controle térmico e agitador SA-12		"	01	475,000	475,000
279	Aparelho p/determinação de matéria orgânica no solo	IKEDA RIKA	peça	01	66,000	66,000
280	Balança leitura direta mod. nº T]200 capacidade 1200/13000 g	MITAMURA	"	01	45,000	45,000
281	Jogo de termometros, 8 peças por conjunto		jogo	01	63,000	63,000
282	Aparelho p/destilação de água, elétrico		"	01	1,398,000	1,398,000
283	Forno automático constante nº 1613-CRC-SD medida 60x60x80 -1 jogo		"	01	650,000	650,000
	TOTAL GENERAL					200,894,380

5. 国立野菜研究センター（CNPH）作成資料

EMPRESA BRASILEIRA DE PESQUISA AGROPECUÁRIA - EMBRAPA

BRAZILIAN CORPORATION FOR AGRICULTURAL RESEARCH

CENTRO NACIONAL DE PESQUISA DE HORTALIÇAS - CNPH

NATIONAL VEGETABLE RESEARCH CENTER

INFORMATION AND PROGRAM

FOR THE

JICA MISSION TO EMBRAPA

TO EVALUATE REQUEST FOR A GRANT TO

IN BRASIL,

JULY - 1984

OUTLINE

1. THE JAPANESE MISSION

- YASUTSUGU TAKATA

  Leader, Senior Officer, Administration Div. Agriculture, Forestry and Fisheries Research Council, Ministry of Agriculture, Forestry and Fisheries (MAFF).

- NORIO KUNIYASU

  Coordination, Staff
  Technical Affairs Division, Agric., Forestry and Fisheries Planning & Survey Dept., Japan International Coop. Agency.

- NABUO MIYASHITA

  Coordination, Deputy Head
  Technical Affairs Division, Agric. Forestry & Fisheries Planning & Survey Dept., Japan International Coop. Agency.

- HIROAKI YOSHIKAWA

  Vegetable, Chief, Second Garden Crops Lab., Second Crop Dept., Hokkaido Agric. Research Station (MAFF).

- SETSUO OHAMA

  Vegetable, Chief Planning Section, Planning and Information Office, Vegetable Research Station (STAFF).

- HIROMITSU MORIYAMA

  Cooperation Planning, Senior Officer, International Coop. Division, International Dept., Economic Affairs Bureau, Ministry of Agriculture Forestry and Fisheries.

2. THE GROUP OF EMBRAPA

2.1. HEADQUARTERS

- Eliseu Roberto de Andrade Alves - President
- José Prazeres Ramalho de Castro - Director
- José Maria Pompeu Memória - International Cooperation Office

2.2. CENTRO NACIONAL DE PESQUISA DE HORTALIÇAS - CNPH
NATIONAL VEGETABLE RESEARCH CENTER

- Flávio Augusto d'Araújo Couto - Head
- Paulo Brasil Paez - Associate Technical Head
- Joaquim Müller P. Azevedo - Associate Administ. Head

2.3. MAILING ADDRESSES

- EMPRESA BRASILEIRA DE PESQUISA AGROPECUÁRIA - EMBRAPA
  (SEDE) - Supercenter Venâncio 2000
  Q. 08 - Bloco B - nº 50 - 6º/9º and.
  Setor Comercial Sul - SCS
  Caixa Postal, 04-0315
  70.312 - Brasília - DF/Brasil
  TELEX (061) 1620 EBPA BR

- CENTRO NACIONAL DE PESQUISA DE HORTALIÇAS - CNPH
  Km 09 - BR 060 - Rodovia Brasília/Anápolis
  Caixa Postal, 07-0218
  70.359 - Brasília - DF/Brasil
  TELEX (061) 2445 CNPH BR

3. CONTACTS OF THE MISSION IN BRAZIL

- Japanese Embassy
- Brazilian Ministry of Foreign Affairs
- Secretary of Planning - Office of International Cooperation - SUBIN
- Ministry of Agriculture
    - Coordination of International Agricultural Cooperation - CINGRA
    - Brazilian Agricultural Research Corporation - EMBRAPA
- Cotia Agricultural Cooperative and AGROFLORA
- Agronomical Institute of Campinas
- "Luiz de Queiroz" Agricultural College
- Vegetable Producers of São Paulo
- Vegetable Producers of Brasilia

4. PROGRAM IN BRASILIA

JUL 19 THURSDAY - Arrival in Brasília

11:00 AM - Flight RG 472 from S. Paulo
00:35 PM - Flight RG 402 from R. Janeiro
03:00 PM - Meeting at Japanese Embassy

JUL 20 FRIDAY

10:00 AM - Meeting at SUBIN - Agency of International Cooperation
Secr. of Planning
11:30 AM - Meeting at EMBRAPA
15:00 PM - Meeting at the Ministry of Foreign Affairs.

JUL 21 SATURDAY

09:00 AM - Visit to vegetable producers in Vargem Bonita
12:00 AM - Lunch
02:00 PM - Visit to vegetable producers in Brazlandia

JUL 22 SUNDAY - Open

JUL 23 MONDAY

08:30 AM - Leave Hotel for CNPH
09:00 AM - Presentation of CNPH program
00:30 PM - Lunch
01:30 PM - Visit to CNPH facilities and field
05:00 PM - Final meeting

JUL 24 TUESDAY

08:30 AM - Open
01:00 PM - Visit to CPAC/EMBRAPA

5. MAJOR ITEMS OF ANALYSIS AND DISCUSSION

1. General context of brazilian cooperation request.
   The importance of Vegetable Crop Research
2. Present activities of CNPH and related institutions.
3. Nature of the cooperation
   a. Species that will be researched
   b. Areas of research
   c. Forms of cooperation
   d. Outline
4. Structure for project implementation
   a. budget
   b. staff
   c. facilities
   d. housing
5. Profile of aid from international organizations and from other countries.

6. VEGETABLE CROP RESEARCH IN BRAZIL - HISTORY AND IMPORTANCE

Since its organization, in 1973, EMBRAPA has gradually increased its support for vegetable research. In 1978 those activities were concentrated in Brasilia due to favorable conditions and to the growing importance of vegetable production in Central and Western Brazil. A staff of 15 researchers was assembled and budget was provided for the construction of buildings and other facilities.

In 1981 the local research unit of Brasilia was transformed into the National Vegetable Research Center, and at that moment counted already with a staff of 40 researchers and an irrigated experimental field of 115 ha.

Due to the increasing importance of vegetables in the brazilian diet, the Brazilian Ministry of Agriculture has requested, in 1980, a technical cooperation agreement to improve staff and facilities for the new Center.

At the opportunity of the visit of the Japanese Mission EMBRAPA/CNPH ratifies the request made in 1980.

The importance of the expansion of vegetable crop research in Brazil is supported by the following facts:

- About 100 species of vegetables are marketed in Brazil. Research is concentred in 31 species that correspond to 80% of the volume consumed.
- In 1982, 7, 9 million t of vegetables were marketed by the Brazilian Vegetable Terminal Markets System and other outlets corresponding to approx. US$ 300 million.
- This volume was 24% higher than the total marketed in 1976.
- Brazil is presently spending around US$ 80 million in imports of vegetables in the form of "in natura" products, processed products and seeds for planting.
- Vegetables are the third most important factor in the cost of food for the average brazilian family. First are meats and second flour. After vegetables come rice, beans, milk and other products.
- In 1980 Brazil exported US$ 19 million in vegetables and there is a good potential to expand exports if technology is developed to improve quality and reduce costs.

- The National Vegetable Research Program of EMBRAPA, coordinated by CNPH, includes, in 1984, 327 projects and is the largest research program of the Brazilian Agricultural Research System. This program is executed in 24 of the brazilian states and territories and includes the 31 most important species.

7. THE NATIONAL CENTER FOR VEGETABLE RESEARCH - CNPH

CNPH was created by EMBRAPA with two main objectives:

1. Coordinate vegetable research in Brazil
2. Develop an in house research program and provide technical and scientific support to the research Center associated to the National Program of Research in Vegetables.

The general objectives of CNPH research activities are to solve basic problems of the vegetable producer as:

a) improve productivity
b) improve quality
c) improve producer's income
d) improve national nutrition
e) reduce imports of vegetables
f) criate new options for export

7.1. FACILITIES

CNPH is located on a farm with 820 hectars. Experimental fields prepared for irrigation comprise 140 ha.

Buildng comprise 12.830 m^3 and are distributed as follows:

Administration building	890 m^2
Library	340 m^2
Laboratories	2150 m^2
General storage and cold chambers	3200 m^2
Machinery and Transportation	600 m^2
Auditorium and Restaurant	2100 m^2
Green Houses	3550 m^2
Total	12830 m^2

The irrigation systems is composed by two main pumps of 150 hp, a 300 mm main pipe line with 1560 m length and a water tank with 7.500 m^3 capacity. There are 13.000 m of distribution pipe lines of different diameter, onde drip irrigation system, and one self propelled irrigation system.

7.2. HUMAN RESOURCES

The following tables (7.2.1. and 7.2.2.) give a general view of the personnel. Table 7.2.3. gives a nominal list of administrators and researchers.

7.2.1. Personnel (general)

SCIENTIFIC	Researchers on duty	30	
	Researchers on grad. studies	13	
	Consultants	08	
	Librarians	02	53
TECHNICAL SUPPORT	Lab. personnel	12	
	Field Technicians	09	
	Laborers	73	
	Drivers and Operators	25	
	Maintenance	5	
	Library	2	126
BUROCRATIC PERSONNEL		43	43
			222

7.2.2. RESEARCH STAFF (JUL./1984)

DISCIPLINE				RESEARCHERS ON LEAVE FOR GRADUATE STUDIES		CONSULTANTS		TOTAL
	B.S.	M.Sc.	Ph.D.	M.Sc.	Ph.D.	M.Sc.	Ph.D.	
BREEDING	-	-	4	-	4	-	2	10
PHYTOPATHOLOGY	1	2	1	-	2	2	2	10
IRRIGATION	1	2	-	-	2	-	-	5
PLANT NUTRITION	-	3	1	-	1	-	-	5
CROPPING SYSTEMS	1	3	-	-	-	-	-	4
PHISIOLOGY	-	1	-	-	3	-	-	4
ECONOMICS	-	1	1	-	-	-	-	2
COMM + DIFFUSION	-	1	1	-	-	-	-	2
MACHINERY	2	-	-	-	-	-	-	2
STATISTICS	-	1	-	-	-	-	1	2
ENTOMOLOGY	-	1	-	-	-	-	-	1
AGROCLIMATOLOGY	-	1	-	-	-	-	-	1
MICROBIOLOGY	-	1	-	-	-	-	-	1
SEEDS	-	-	-	-	1	-	1	2
LIBRARY	2	-	-	-	-	-	-	2
	7	17	8	-	13	2	6	53

7.2.3. NOMINAL LIST OF ADMINISTRATORS AND RESEARCHERS (JUL/1984)

HEAD:	FLÁVIO A. A. COUTO, Ph.D.
TECHNICAL ASSOCIATE HEAD:	PAULO B. PAEZ, Ph.D.
ADMINISTRATIVE ASSOCIATE HEAD:	JOAQUIM MÜLLER P. AZEVEDO

RESEARCHERS

1. ADHEMAR CARICATTI FILHO	B.S.	MACHINERY
2. ALVACIR ALBERTO FEDALTO	M.Sc.	CROPPING SYSTEMS
3. ANTONIO CARLOS DE AVILA	M.Sc.	PHYTOPATHOLOGY
4. ANTONIO FRANCISCO SOUZA	M.Sc.	PLANT NUTRITION
5. CÉLIA MARIA T. CORDEIRO	M.Sc.	STATISTICS
6. CLÁUDIO B. DA SILVA	M.Sc.	PHYTOPATHOLOGY
7. ECILDA LUCI S. SOUZA	M.Sc.	PHYSIOLOGY
8. FELIX HUMBERTO FRANÇA	M.Sc.	ENTOMOLOGY
9. FRANCISCO J.B. REIFSCHNEIDER	Ph.D.	PHYTOPATHOLOGY
10. FRANCISCO EDUARDO C. ROCHA	B.S.	MACHINERY
11. GUARANY CARLOS GOMES	Ph.D.	ECONOMICS
12. HENOQUE RIBEIRO DA SILVA	B.S.	IRRIGATION
13. JOÃO ALVES M. SOBRINHO	M.Sc.	CROPPING SYSTEMS
14. JOSÉ DE ALMEIDA LIMA	M.Sc.	PLANT NUTRITION
15. JOSÉ RONALDO MAGALHÃES	Ph.D.	PLANT NUTRITION
16. LEONARDO DE B. GIORDANO	Ph.D.	BREEDING
17. MANOEL VICENTE M. FILHO	M.Sc.	PLANT NUTRITION
18. MARCELO DE TARGA ARAÚJO	Ph.D.	BREEDING
19. NATHANIEL J.T. BLOOMFIELD	M.Sc.	IRRIGATION
20. NEVILLE VIANA B. REIS	M.Sc.	AGROLIMATOLOGY
21. NOZOMU MAKISHIMA	M.Sc.	TECHNOLOGY DIFFUSION
22. OSMAR ALVES CARRIJO	M.Sc.	IRRIGATION
23. OTONIEL SOARES CASTOR	M.Sc.	ECONOMICS
24. OSSAMI FURUMOTO	B.S.	CROPPING SYSTEMS
25. PAULO TARCISIO D. VECCHIA	Ph.D.	BREEDING
26. RAIMUNDA MISSIAS DA SILVA	B.S.	PHYTOPATHOLOGY
27. ROBERTO VICENTE COBBE	Ph.D.	COMMUNICATION
28. WANLOU COELHO E SILVA	M.Sc.	MICROBIOLOGY
29. WILSON ROBERTO MALUF	Ph.D.	BREEDING
30. YOSHIHIKO HORINO	M.Sc.	CROPPING SYSTEMS

RESEARCHERS ON LEAVE FOR GRADUATE STUDIES (Ph.D.)

1.	ADONAI GIMENES CALBO	PHYSIOLOGY
2.	ANTONIO CARLOS TORRES	PHYSIOLOGY
3.	CARLOS ALBERTO LOPES	PHYTOPATHOLOGY
4.	CARLOS ALBERTO S. OLIVEIRA	IRRIGATION
5.	CLAUDINEI ANDREOLI	SEEDS
6.	JAIRO VIDAL VIEIRA	BREEDING
7.	JOÃO EUSTÁQUIO C. MIRANDA	BREEDING
8.	JOÃO MARIA CHARCHAR	PHYTOPATHOLOGY
9.	JOSÉ AMAURI BUSO	BREEDING
10.	JOSÉ FLÁVIO LOPES	BREEDING
11.	RUY REZENDE FONTES	PLANT NUTRITION
12.	WASHINGTON L.C. SILVA	IRRIGATION
13.	WELINGTON PEREIRA	PHYSIOLOGY

CONSULTANTS

1.	ANTONIO CARLOS GUEDES	(Ph.D.)	SEEDS
2.	ARMANDO TAKATSU	(Ph.D.)	PHYTOPATHOLOGY
3.	FERMIN DE LA PUENTE	(Ph.D.)	BREEDING
4.	JUAN ESPINAL AGUILAR	(M.Sc.)	PHYTOPATHOLOGY
5.	NORBERTO DA SILVA	(Ph.D.)	BREEDING
6.	PEDRO EMILIO F. ROSSI	(Ph.D.)	STATISTICS
7.	SHIOU PIN HUANG	(Ph.D.)	PHYTOPATHOLOGY
8.	MARTINUS A. BEEK	(M.Sc.)	PHYTOPATHOLOGY

LIBRARIANS

1. MARIA DE FÁTIMA B. F. LIMA
2. JOÃO BATISTA SPINA

7.3. ACTIVITIES OF CNPH

Activities of CNPH comprise the following lines:

- Coordination of the National Vegetable Research Program
- In house research
- Marketing of technology
- Production Projects

7.3.1. COORDINATION OF THE NATIONAL VEGETABLE RESEARCH PROGRAM - NVRP

CNPH is the coordination agnecy for the NVRP. NVRP comprises, in 1984, 327 projects, 31 vegetables species.

This program is executed by a cooperative system of research organizations that includes 33 of such units in 1984.
These research organizations are located in 24 states and territories of Brazil as can be viewed in the map in the following page.

The tables and map of the following pages provide a general view of the program.

NATIONAL VEGETABLE RESEARCH PROGRAM - 1984

RESEARCH AREAS X CROPS

RESEARCH AREA X CROP	BREEDING	PHYTOPATHOLOGY	PLANT NUTRITION	CROP MANAGEMENT	ENTOHOLOGY	IRRIGATION	WEED CONTROL	PHISIOLOGY	ECONOMICS	SEEDS	NEMATOLOGY	MACHINERY	AGROIND. TECHNOL.	ZONING.	CLIMATOLOGY	DIFF. TECHNOL.	STORAGE	SOIL MICROS.	TOTAL
1. TOMATO	25	6	9	3	9	3	1	2	2	-	1	1	-	-	1	-	-	-	63
2. GARLIC	16	10	8	6	1	3	6	2	-	-	2	1	1	-	-	-	1	-	57
3. POTATO	20	9	7	5	5	2	-	2	1	2	-	-	1	-	-	-	-	-	54
4. ONION	15	3	1	2	-	-	2	1	-	-	-	1	-	1	-	-	-	-	26
5. CARROT	9	2	3	2	-	1	1	-	-	1	2	-	-	-	-	-	-	-	21
6. MISCEL.	1	1	3	-	-	1	-	1	5	1	-	-	-	-	-	-	-	-	13
7. PEAS	4	1	-	1	-	-	-	-	-	1	-	-	-	1	-	-	-	1	09
8. CUCUMBER	4	1	1	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	09
9. SWEET CORN	5	-	-	-	-	-	-	-	-	1	-	-	-	-	1	-	-	-	07
10. STRAWBERRY	2	1	1	1	-	1	-	-	-	-	-	-	-	-	-	1	-	-	07
11. GREEN PEPPERS	3	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	06
12. SWEET POTATO	4	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	06
13. CABBAGE	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	06
14. OKRA	1	2	-	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-	05
15. ASPARAGUS	2	-	1	1	-	-	-	1	-	-	-	-	-	-	-	-	-	-	05
16. LETTUCE	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	04
17. PUMPKIN	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	04
18. GEN. CURBIT.	2	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	03
19. CAULIFLOWER	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	03
20. GREEN BEANS	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	03
21. RED BEET	-	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	02
22. MELON	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	02
23. YAM	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	02
24. CHAYOTE	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	02
25. TARO	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	01
26. WATERMELON	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	01
27. HOT PEPPER	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	01
28. GINGER	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	01
29. JILO	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	01
30. MUSTARD	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	01
31. BROCCOLI	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	01
TOTAL	138	40	37	26	17	13	11	09	08	08	06	03	03	02	02	01	02	01	327

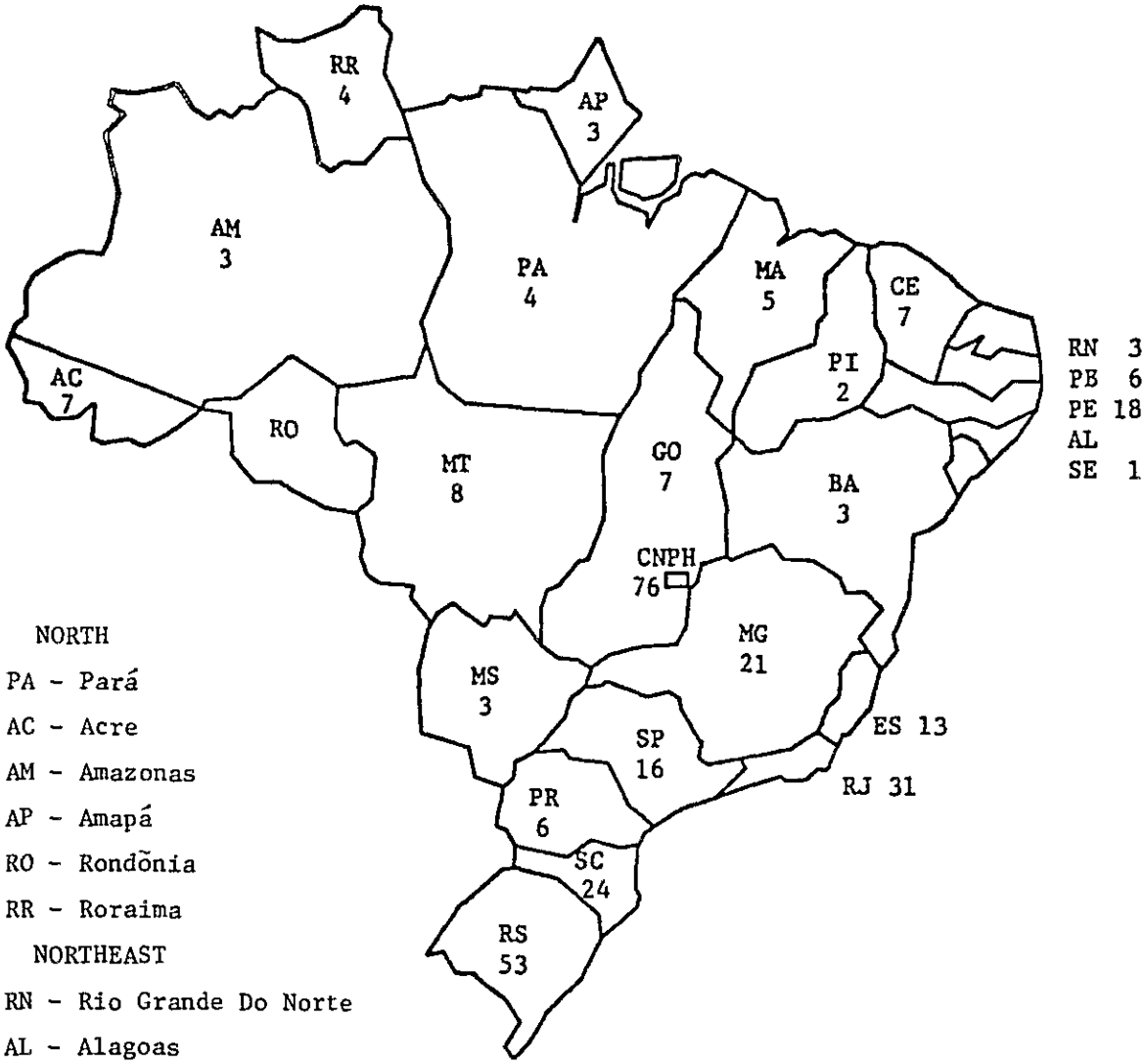
NATIONAL VEGETABLE RESEARCH PROGRAM - 1984

RESEARCH AREAS X STATES AND TERRITORIES.

RESEACH AREA X STATES	BREEDING	PHYTOPATHOLOGY	PLANT NUTRITION	IRRIGATION	ECONOMICS	CROP MANAGEMENT	SEEDS	PHYSIOLOGY	WEED CONTROL	ENTHOMOLOGY	NEMATOLOGY	MACHINERY	STORAGE	CLIMATOLOGY	DIFF. TECHNOLOGY	SOIL MICROBIOLOGY	ZONING	AGROIND. TECHNOLOGY	TOTAL
1. DF-CNPH	23	11	11	8	5	4	3	3	-	2	2	1	1	1	-	1	-	-	76
2. RS	17	8	10	1	1	4	2	1	3	2	-	-	1	1	1	-	1	-	53
3. RJ	12	6	2	-	1	6	1	1	-	2	-	-	-	-	-	-	-	-	31
4. SC	9	2	2	-	-	5	-	1	2	2	1	-	-	-	-	-	-	-	24
5. MG	3	1	5	1	-	1	-	-	3	5	-	-	-	-	-	-	-	2	21
6. PE	9	-	2	-	-	1	2	2	-	1	-	-	-	-	-	-	1	-	18
7. SP	4	6	-	-	1	-	1	-	-	1	1	2	-	-	-	-	-	-	16
8. ES	6	2	1	1	-	-	-	-	1	2	-	-	-	-	-	-	-	-	13
9. MT	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	08
10. AC	5	-	-	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	07
11. CE	3	-	2	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	07
12. GO	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	07
13. PB	3	-	1	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-	06
14. PR	5	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	06
15. PA	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	06
16. MA	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	05
17. RR	2	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	04
18. AM	1	1	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	04
19. RN	2	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	04
20. AM	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	03
21. BA	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	03
22. MS	2	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	03
23. PI	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	02
24. SE	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	01
	138	40	37	13	08	26	09	09	11	17	06	03	02	02	01	01	02	03	327

NATIONAL VEGETABLE RESEARCH PROGRAM-1984

RESEARCH PROJECTS X STATES OF BRAZIL



NORTH

PA - Pará

AC - Acre

AM - Amazonas

AP - Amapá

RO - Rondônia

RR - Roraima

NORTHEAST

RN - Rio Grande Do Norte

AL - Alagoas

BA - Bahia

CE - Ceará

MA - Maranhão

PB - Paraíba

PE - Pernambuco

PI - Piauí

SE - Sergipe

SOUTHEAST

ES - Espírito Santo

MG - Minas Gerais

RJ - Rio de Janeiro

SP - São Paulo

CENTER WEST

DF - Distrito Federal

GO - Goías

MS - Mato Grosso do Sul

MT - Mato Grosso

SOUTH

SC - Santa Catarina

PR - Paraná

RS - Rio Grande do Sul

7.3.2. In house research

CNPH's research program for 1984, includes 76 projects, involving 22 species as presented in the following table

SPECIES	Nº OF PROJECTS
1. POTATO	16
2. TOMATO	11
3. GARLIC	9
4. CARROT	7
5. ONION	5
6. PEAS	5
7. CAULIFLOWER	2
8. GREEN BEANS	2
9. MELON	2
10. SWEET CORN	2
11. CUCUMBER	2
12. SWEET PEPPER	2
13. SWEET POTATO	1
14. BROCCOLI	1
15. GINGER	1
16. WATER MELON	1
17. STRAWBERRIES	1
18. MUSTARD	1
19. HOT PEPPER	1
20. CABBAGE	1
21. MISCELANEOUS	5
	76

The strongest concentration of research is in Breeding, Phytop Phytopathology and Plant Nutrition, in view of the general need of producers and the availability of researcher and facilities.

RESEARCH PROJECTS BY DISCIPLINE

DISCIPLINE	Nº OF PROJECTS
1. BREEDING	23
2. PLANT SANITY	15
3. PLANT NUTRITION	11
4. IRRIGATION	8
5. ECONOMICS	5
6. CROPING SYSTEMS	4
7. SEEDS	3
8. PHYSIOLOGY	3
9. MECHANIZATION	1
10. STORAGE	1
11. CLIMATOLOGY	1
12. SOIL MICROBIOLOGY	1
	76

DESCRIPTION OF RESEARCH LINES:

a) PLANT GENETICS - With emphasis on breeding - to develop new cultivars, better adapted to tropical and subtropical conditions, with resistance to diseases, higher productivity, reduction of produciton cost and better quality.

A especial effort is devoted to development of cultivars apt to grow and produce in the hot and humid conditions of the brazilian summer.

b) PLANT SANITY - Development of integrated control of pests and diseases.

c) FERTILIZING AND PLANT NUTRITION - Techniques and formulation with emphasis on reduction of fertilizer consumption. Includes biological nitrogen fixation.

d) IRRIGATION - For optimal water supply with water and energy saving.

e) ECONOMICS - Emphasis on marketing, studying different factors affecting vegetable marketing and advising governmental agencies on legislative and normative action for consumer protection.

f) CROPPING SYSTEMS - To optimize production systems of priority species for different regions, seeding techniques, transplantation, fertilizing, irrigation, weed control and harvest, with emphasis on saving of petroleum derivates.

g) SEEDS - Conjugated with breeding this line develops seed production technology, particularly for tropical and subtropical species.

h) PHYSIOLOGY - Includes various aspects such as Weed Control, methods of in vitro propagation and others necessary for support of other research areas.

i) MACHINERY - Mechanization of vegetable production by the design or adaptation of machines for all phases of the process of productions.

j) STORAGE AND PRESERVATION - Post harvest physiology and reduction of losses.

k) CLIMATOLOGY - Plant-climate relation mainly for zoning purposes.

l) SOIL MICROBIOLOGY - As a means of saving fertilizers by way of biological nitrogen fixation.

7.3.3. MARKETING OF TECHNOLOGY (Diffusion of Technology)

CNPH transfers the results of its research efforts by means of a program of communication and diffusion of technology. The main products and services of this program are:

1. TECHNICAL CONSULTATION - For producers and technicians, personnally and by correspondence.

2. PUBLICATIONS

   - Technical instructions - practical orientation for producers and field technicians.
   - Scientific series - For technicians and researchers
   - Journal articles - in brazilian and foreign journals

3. FIELD DAYS - Vegetable producers are invited to get acquainted with CNPH activities in laboratories and experimental fields. Includes specific technical demonstration days.

4. TECHNICAL MEETINGS - Of researchers with extension agents for discussion and solution of problems.

5. TALKS - By researchers to producers and/or technicians.

6. SEMINARS - Weekly program of presentation and discussion of different subjects related to CNPH research activities.

7. VISITS AND EXCURSIONS - Groups of producers, students and technicians are given informations on CNPH activities.

8. COURSES - CNPH of in other locations for farmers or technicians especially extension agents.

9. IN HOUSE TRAINING - For students or professionals in the agricultural sciences.

10. TECHNICAL ADVISORY SERVICES - For other research intitutions for extension agencies, for municipal and state governments and for

private enterprise.

11. COOPERATIVE PROJECTS WITH PRIVATE ENTERPRISE - Research contracts with agricultural or industrial firms for solution of speicific technological problems.

12. COOPERATION WITH THE AGRICULTURAL EXTENSION SERVICE - All technological diffusion activities are developed in cooperation with the local agricultural extension offices.

13. LABORATORY ANALYSIS - Soil and plant disease analysis for producers, technicians and institutions.

7.3.4. PRODUCTION PROJECTS

To aid the research process and diffusion of technology and to provide additional funds, CNPH performs some production, mainly seed productions. The seeds are a means of diffusing the use of improved cultivars developed by the Center until the seed industry incorporates them in their production programs. Production to the local vegetable farmers by this method CNPH introduced pea and garlic cultivation in the Federal District. Presently pea production is also practiced by farmers in the surrounding states - Minas Gerais, Goias, Mato Grosso do Sul, and S. Paulo.

7.4. BUDGETS FOR 1984

7.4.1. CNPH

Item	US$ 1,000	%
Personnel	1,206,365	53
Investment	512,702	22
Research projects	138,866	6
Other expenditures	447,124	19
Total	2,305,037	100

7.4.2. National Vegetable Research Program

Research projects US$ 272,796.

7.5. MAJOR SCIENTIFIC AND TECHNOLOGICAL CONTRIBUTIONS OF CNPH

BREEDING

- Carrots: Brasília - a cultivar adapted to hot and humid climate, good for summer production in Brazil. Performs very well in all regions of the country.

  Kuronan - a cultivar adapted for summer conditions in Southern Brasil and in mountainous regions of the southeast. This result was achieved through cooperation of CNPH with the Agriculture College of the University of S. Paulo.

- Sweet potatoes - Cultivars selected for the region of Brasilia: Coquinho, Brazlândia Branca, Brazlândia Roxa and Brazlândia Rosada. These cultivars have good commercial characteristics and are resistant to soil insects.

- Peas - Introduction and adaptation of cultivars in the brazilian central plateau. Establishment of the cropping system.

- Cauliflower - Genetic material adequate for the Northeast. Developed in cooperation with the Agricultural Research Corp. of the state of Pernambuco.

- Cucumber - For pickles - for processing industries of southern Brazil.

  For salad - a hybrid with good agronomical and commercial qualities for production in the central plateau of Brazil.

- Potato - a) materials resistant to PLRV;
  b) adapted for the savannah region;
  c) resistant to leaf miner fly;
  (still under research)

- Tomato - F_2 generations of salad tomato for the northeast.

- Melon - a cultivar resistant to Virus I

- Green Peppers - resistant to P. capsici (in final research stage).

PLANT NUTRITION - Formulae for fertilization of vegetable crops in Savannah soil and climate.

PLANTPHYSIOLOGY - "In vitro" techniques of propagation for cauliflower, sweet potatoes, garlic, carrots, potato, yams.

CULTIVATION TECHNIQUES - General cultivation techniques for vegetables including weed control.

CLIMATOLOGY - Peas cumulative heat units
Sweet corn cumulative heart units

IRRIGATION - Parameters for vegetable crop irrigation in the savannah region.

INSECT AND DISEASE CONTROL - Integrated control for various vegetable crops

MECHANIZATION - Garlic planter
- Precision pesticide sprayer
- Pot washer
- Precision seeder for experimental plots

ECONOMICS - PROFAZENDA - A computerized agricultural administration system adapted also for vegetable production.

8. INTERNATIONAL COOPERATION PROGRAM OF CNPH

Several international and foreign support programs aid the CNPH activities:

- IPC - The International Potato Center maintains a regional office at CNPH. It provides support for potato research, training of brazilian researchers and diffusion of potato consumption.

- Germany, Canada, France, The Netherlands, Polland and Sweden: participation in the potato cultivar national test.

- USA - technical advice on request.

- France - technical advice on request.

9. CNPH's EXPECTANCIES IN RELATION TO JICA

CNPH's research concentrates on species of higher economic importance. Following species are in need of more technical support.

- Brassicaceae - broccoli, cauliflower and cabbage.
- Cucurbitaceae - pumpkin watermelon, melon and cucumber.
- Onion
- Carrot
- Tomato

These vegetables corresponde to 62% of the total vegetables marketed in Brazil.

Major lines of research to be emphasized are:

- Breeding
- Plant sanity-insect and diseases
- Plant untrition
- Mechanization
- Physiology
- Cropping systems.

Our sector of marketing of technology needs also to be improved and expanded in order to handle the increased flux of information generated by our research program.

An evaluation of present staff and building conditions indicates that there resources an numerically sufficient at this stage. Pressing needs are detected at the level of laboratory instrumentation and equipment and experiment field logistical support.

The technical cooperation of the Japanese Government will be of great value through the advice and work of the consultants, the training of Brasilian researchers and the equipment that will improve the laboratory, field and marketing of technology facilities, which are doubtless important to the present development of the vegetable production in Brasil.