

インド農業研究協力
実施調査団報告会資料

昭和48年3月

海外技術協力事業団
農業協力部

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は じ め に

1. 海外技術協力事業団は外務省の委託を受け、インド農業研究協力実施調査団をオノ次およびオ2次にわたりインドに派遣した。この調査団は、昭和46年ノ月～ノ2月に永井卓太郎氏を団長としたインド農業研究協力予備調査団の調査結果を受けて派遣されたものである。
2. オノ次調査団は岩佐俊吉氏を団長として、昭和47年ノ月2日～47年ノ月25日の間派遣され、園芸分野における技術協力の可能性についてインド西北部（ヒマチヤル・プラデイツ州）、インド東部（ビハール州）、アッサム地方（メガラヤ州）および南部デカン高原地方（マイソール州）の園芸事情、園芸試験場等を調査し、その結果に基づき、野菜の一代雑種種子の生産法、落葉果樹の生態等に関する研究協力を実施することに日・印間でおおむね合意に達した。
3. オ2次調査団は、河野達郎氏を団長として、昭和47年ノ2月ノ6日～47年ノ2月29日の間派遣され、イネの病害虫発生予察法の確立に関する研究および園芸の研究の二つの研究計画を内容としたインド農業研究協力（日本・インド共同農業研究プロジェクト）の実施の詳細について打合わせた。
4. この結果、園芸の研究計画については、野菜の一代雑種の種子生産法に関する研究ならびにかんきつ類および落葉果樹類の栽培法に関する研究の実施に因りて日・印双方合意に達した。しかし、病害虫発生予察法の確立に関する研究計画については、研究場所として日本側はニューデリーのインド農業技術研究所（IARI）を中心にノ部ハイデラバードの全インド稲作改良実験所（AICRIP）を加えた2場所を主張したのに対し、インド側はさらにこれにカタックの中央稲作研究所（CRRI）を前二者と同格に加えることを強行に主張したため、年末で時間的余裕がなかったこともあつて、双方最終的な合意に到らず、調査団はノ2月29日に帰国した。
5. このため、インド農業研究協力の実施に関する合意議事録は、前記病害虫分野の研究場所の問題で合意に到らなかったため、双方が合意を確認する署名には致らなかった。よつてこの点に因り、現在外交ルートを通じてさらに折衝中である。
6. この報告会資料は、オノ次およびオ2次の2回にわたる調査団の帰国報告会における資料を中心にとりまとめたもので、実施調査団としての正式な報告書は、研究協力の内容につき、日・印双方最終的に合意に達した段階で、詳細な研究計画を含めて刊行する予定である。

昭和48年3月

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海外技術協力事業団農業協力部



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I. 第1次インド農業研究協力実施調査団

(昭和47年11月2日～昭和47年11月25日)

1. 調査団の編成

岩佐 俊吉

(田長兼常緑果樹担当)

前茨城県園芸試験場長，茨城大学農学部講師

久保田 貞三

(落葉果樹担当)

農林省園芸試験場盛岡支場主任研究官

小谷 晃

(野菜担当)

農林省園芸試験場興津支場主任研究官

粕谷 和夫

(業務調整)

海外技術協力事業団農業協力部

2. 調査団の日程

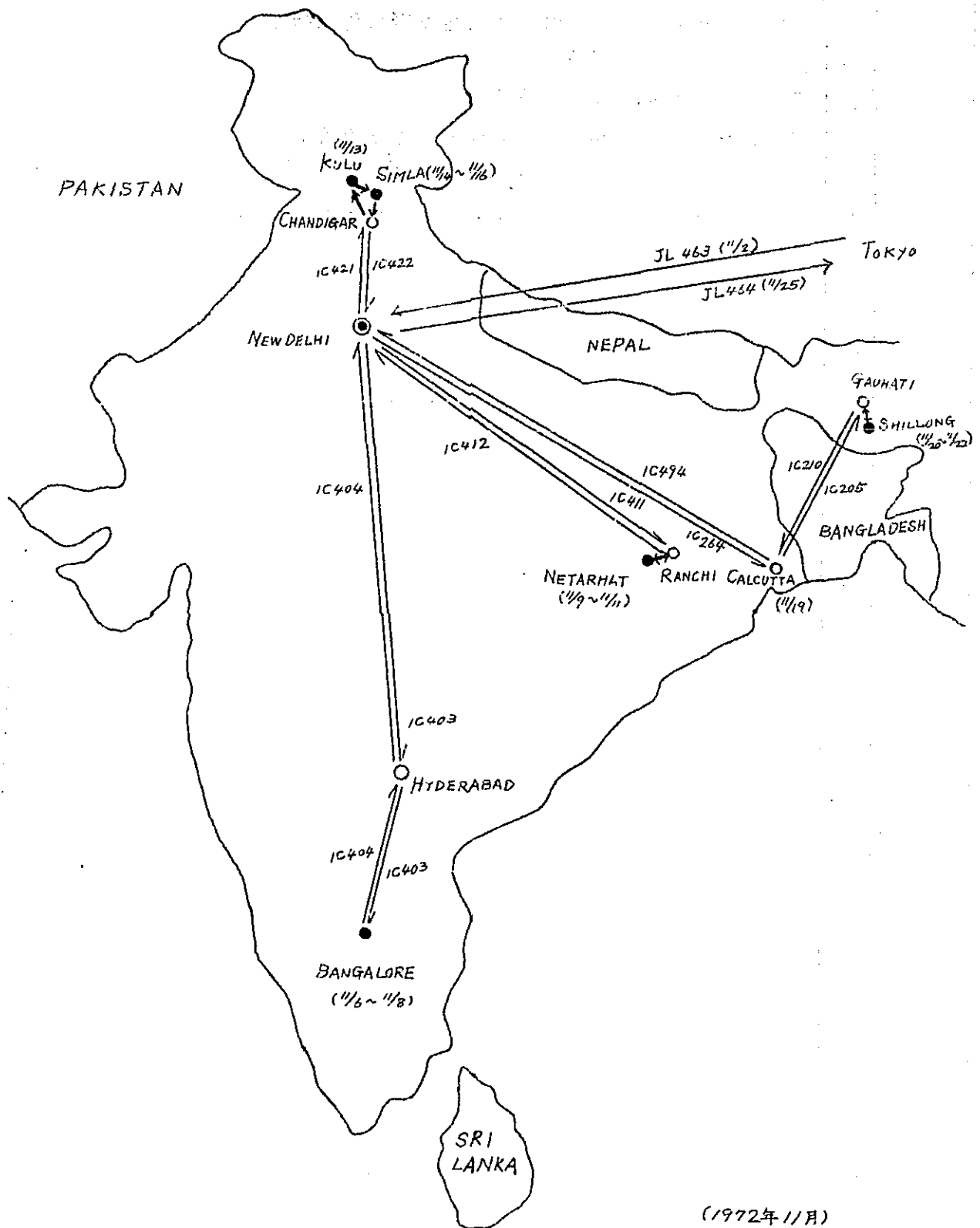
月	日	曜	事	項
11	2	木	東京 → ニューデリー (JL 463) ニューデリー着 20.10 (ニューデリー泊) 宿舎にて大使館小坂農務官およびOTCA下村職員とスケジュール打合せ	
	3	金	午前：大使館にて小島大使 小林参事官表敬 (ニューデリー泊) 小坂農務官およびOTCA稲垣事務所長と打合せ 午後：インド農業省にてオノ回打合せ (インド側出席者：Mr. P. V. Shenoi (Director) 他ICARおよびDep. of Agr. から4名)	
			(調査日程の決定)	
	4	土	午前：インド農業技術研究所(ブサ)にて肉係部長と打合せ(ニューデリー泊) 野菜花卉部(Dr. Choudhary)、果樹部(Dr. R. N. Shingh) Seed of Technology (Dr. Amir. Shingh) 午後：インド農業省にてNational Seeds Corporationのスタッフと 打合せ (Dr. Meta 他4名)	
			(調査日程の変更)	
	5	日	調査日程変更にとまなう航空券、宿舎等のアレンジ (ニューデリー泊) 調査方針に関する団内協議	
	6	月	ニューデリー → バンガロール (IC 403) バンガロール着 10.15 (バンガロール泊) 午前：国立園芸試験場にDr. G. S. Randhawa 場長を訪ね 来場目的を 説明 午後：試験場圃場および研究室の視察	
	7	火	午前：Indo-American Seed Corporation を視察 (バンガロール泊) 午後：国立園芸試験場にて研究協力に関する打合せ (インド側出席者、 Dr. G. S. Randhawa 場長他各部長全員)	
	8	水	バンガロール市内の野菜、果実マーケット調査および (ニューデール泊) バンガロール周辺の果樹産地視察後園試場長と打合せ バンガロール → ニューデリー (IC 404) ニューデリー着 23.00	

月	日	旺	事	項
11.	9	木	ニューデリー → ランチ (IC 411) ランチ着 12.00 ランチにて Dr. Bhatnagar (Director) および B. S. Singh (Joint Director) と打合せ ランチ → ネタールハット (自動車) ネタールハット着 18.30 (ネタールハット泊)	
	10	金	ネタールハットにて Agriculture farm (州立) および 園芸開発予定地域を視察 ネタールハット → ランチ (自動車) ランチ着 18.30 夜: ビハール州 Agricultural College にて Mr. S. M. Alam 学長とこん談	(ランチ泊)
	11	土	ランチ → ニューデリー (IC 412) ニューデリー着 19.00 (4時間遅れ) (ニューデリー泊)	
	12	日	大使館にて小坂農務官と打合せ 中間報告書のとりまとめ	(ニューデリー泊)
	13	月	ニューデリー → シマンデイガール (IC 421) シマンデイガール → マンデイ → クル (自動車) クル着 19.00	(クル泊)
	14	火	IARI Vegetable Research Station (クル) およびクル、マンデイのりんご産地を視察 クル → マンデイ → シムラ (自動車) シムラ着 21.45 (シムラ泊)	
	15	水	午前: Regional Fruit Research Station (シムラ) を訪問し (シムラ泊) 場内視察および意見交換、付近のりんご産地視察 午後: Himachal Pradesh 州 Dep. of Horticulture にて園芸に関する技術協力について打合せ (インド側出席者 Mr. Harbans Singh, Director of Horticulture 他 10名)	
	16	木	College of Agriculture (Solan, Himachal Pradesh) を訪問し 研究室視察および意見交換 (インド側出席者 Dr. Het Ram Kapra, Dean 他園芸関係教授 6名および Himachal Pradesh, Mr. H Singh, Director of Hort.)	

月	日	旺	事	項
11	16	木	シムラ → ソラノ → シマソデイガー (自動車) シマソデイガー → ニューデリー (IC 422) ニューデリー着 17.30 大使館にて報告者のとりまとめ (18.00 ~ 20.00) (19日~22日の間アッサム地方調査することを決定)	(ニューデリー泊)
	17	金	午前: 報告者とりまとめ 午後: 農業省にてオ2回打合せ (インド側出席者 Dr. Shensi 他5名)	(ニューデリー泊)
	18	土	午前: 小坂農務官を交じえ田内協議. <i>Minutes</i> の 原案作成 午後: 農業省にてオ3回打合せ (インド側出席者 Dr. Shensi 他5名) = 協力の大筋につき双方合意した =	(ニューデリー泊)
	19	日	ニューデリー → カルカッタ (IC 264) カルカッタ着 23.55 (飛行機ヲ時間遅れる.)	(カルカッタ泊)
	20	月	カルカッタ → ゴーハチ (IC 205) ゴーハチ着 7.00 ゴーハチ → シロン (自動車) シロン着 16.30 <i>Regional Fruit Research Station, Citrus Fruit Research Station, Ginger Development Station</i> の視察およびかんきつバナナ、パインナップルの産地視察	(シロン泊)
	21	火	シロン周辺の野菜果実産地および落葉果樹の開発予定地ならびに <i>Fruit Garden (Gov. of Megh)</i> および <i>Fruit Preservation Center (Gov. of Megh)</i> を視察後 <i>Mr. Ranthan (Secretary of Agr.)</i> と打合せ	(シロン泊)
	22	水	午前: <i>Potato Research Center (ICAR)</i> および <i>Fruit Research Station (Gov. of Megh)</i> の視察および同研究者と話し合い。 午後: シロン → ゴーハチ (自動車) ゴーハチ → カルカッタ (IC 210) カルカッタ着 17.15 カルカッタ → ニューデリー (IC 494) ニューデリー着 20.30 (ニューデリー泊)	

月	日	曜	事	項
11.	23	木	午前：農業省にて <i>Dr. Daljit Singh</i> (Director, Horticulture) と予備打合せ 午後：ニューデリー市内プサ周辺の野菜産地視察	(ニューデリー泊)
	24	金	農業省にてオ4回最終協議 <i>Minutes on discussion</i> の作成 (双方合意)	(ニューデリー泊)
	25	土	ニューデリー → 東京 (JL 464) 東京着 22:30	

3. 調査団の行動図



(1972年11月)

4. 調査団がインド政府に提出した報告書

REPORT OF OBSERVATIONS MADE ON THE SURVEY TOUR TO HORTICULTURAL AREAS CONDUCTED IN NOVEMBER 1972

Dr. S. Iwasa
(Specialist on Evergreen Fruit Tree)
Ex-director, Ibaraki Prefectural Horticulture
Research Station

Mr. T. Kubota
(Specialist on Deciduous Fruit Tree)
Senior Researcher, Horticulture Research Station,
Ministry of Agriculture & Forestry

Mr. A. Kotani
(Vegetable Specialist)
Senior Researcher, Horticulture Research Station,
Ministry of Agriculture & Forestry

Mr. K. Kasuya
(Coordinator)
Overseas Technical Cooperation Agency, Tokyo.

1. Purpose of the visit of this Survey Team:

The Japanese Survey Mission headed by Dr. K. Nagai visited India from November 21 through December 17, 1971 for the purpose of finding the possibility of having a Joint Research Project for establishment of the methods of forecasting outbreak of rice diseases and insect pests and for an exploratory survey and discussion regarding the possibility of collaboration in horticulture. The Mission including Dr. Iwasa as a member had observation tour to various horticultural areas, but due to the national emergency they could not complete the observation fully as was scheduled. The second team headed by Dr. Iwasa now in India has been dispatched for the purpose of having the observation tour to the uncompleted areas left out last year. It is also dispatched for the purpose of discussing and formulating the outline of possible collaboration project/s between the two countries.

2. Observation made on our survey tour:

We have found it useful and practicable to have the collaboration on research. Although Indian research in the field of horticulture have much advanced, research on the establishment of cultivation methods on apples, peaches and citrus fruits; and on hybrid seeds production method of vegetables are now important subjects to be further promoted in India. On these subjects Japan has been long experienced and well established research data and information. As such, the collaboration project in such fields might be practicable.

3. Possibilities of research in horticulture:

(1) Research on hybrid seeds production method on vegetables:

It is generally felt that it is essential for vegetable cultivation in India to improve irrigation and drainage facilities, soil conditions with organic matters, and the cultivation techniques including nursing and transplanting and to carry out timely plant protection measures. Moreover, research works on breeding and hybrid seeds production for some important kinds of vegetables are felt to help increase to stabilize vegetable productions in India. However, it might be mentioned that whether the hybrid seeds production would be economical or not to vegetable growers, would depend much on the improvements in cultivation methods mentioned earlier. In view of the strong demands put forth by the Indian scientists and wide experiences in Japan on the establishment of hybrid seeds production method, research on hybrid seeds production method of vegetables might be practicable to be taken up as a collaboration between the two countries. The tentative operational programme is as shown in Appendix 2. The important vegetables that could be taken up are cabbage, cauliflower, tomato, onion, watermelon and radish. The collaboration could be carried out at Hesarghatta and Katrain for tropical and temperate vegetables respectively.

(2) Collaboration on Apples and Peaches:

Ecological conditions in the producing areas visited by the team are different from these of Japan, and it was felt that the improvement of tree growth and fruit quality was essential.

Applied research not only on cultivation methods but also on post-harvesting might be necessary. Although Indian research has been advanced, the studies on improvement of soil conditions, establishment of plant protection methods, and arrangement of transportation in the area would be urgent and important problems now-a-days.

As Japan has been much established in these fields, it might be practicable to offer the research data, some informations, and to extend the collaboration work on research project. However, it was felt that the ecological condition in the producing area was different from those of Japan. Therefore, the ecological survey as showed in Appendix 2 would be necessary for applying research results of Japan as mentioned above.

For that purpose, it would be better to be accompanied with the suitable experimental field which would be well mechanized in order to study on improvement of soil conditions, establishment of plant protection methods and arrangement of transportation, and it might be necessary that Indian side takes necessary measures to apply and demonstrate the results of research for development of growing.

(3) Collaboration on the Citrus culture:

General View:

India is the original place of citrus species in the world, and has long history on their cultivation. The citrus culture in India has been progressed as compared with that of deciduous fruit, not only on

cultivation but also investigation field. But generally, it was felt that how to control the citrus die-back caused by virus and some diseases, and how to supply the organic matter into the orchard soil would be the most fundamental and important problems.

Possibility of Collaboration:

The important citrus species in India are tropical or sub-tropical and that of Japan is temperate and growing under different circumstances. Therefore, the possibility of collaboration between two countries might not be practicable. However, it might be helpful to exchange the techniques to promote the citrus industry in both countries. For this purpose, before everything, it would be better to exchange citrus scientist and research data and information of two countries, rather than to have cooperative works under the technical cooperation scheme.

APPENDIX 1

1. Fundamental research:

- (1) Study on fundamental techniques to produce hybrid seeds such as vernalisation, chemical emasculation etc.
- (2) Study on techniques of finding out, utilization and maintenance of male-sterile, self-incompatible, gynocious or polyploidy lines.

2. Applied Research:

- (1) Selection of suitable and economical materials adaptive to local ecological conditions.
- (2) Study on interaction between breeding lines, and some ecological factors and cultivation techniques.

3. Laboratory facilities to be required:

- (1) Inoculation chamber
- (2) Homogenizer
- (3) Pollination chamber

4. Expected effects of researches:

- (1) Genetical fixation with the most suitable lines mentioned 2 (1) with the most suitable method.
- (2) Finding of combining abilities of newly released lines.
- (3) Finding of useful breeding lines such as male-sterile self-incompatible lines etc., which could produce hybrid seeds more economically.

REMARKS:

It might be advisable to conduct the research works mentioned above at the Institute of Horticulture Research in Bangalore and an associated research station in the Northern region.

APPENDIX 2

Contents of Ecological Survey:

1. Study on climate conditions (air temperature, soil temperature, rainfall, day length, sunshine, wind etc.)
2. Study on soil conditions (physical and chemical properties)
3. Study on biological circumstances (diseases, insects and animal pests)
4. Study on interactions between the above mentioned ecological factors, growth, yields and fruit qualities.

5. 園芸分野における協力の可能性に関する調査団と
インド政府当局との Minutes

Minutes of the discussion on the possible collaboration in the field of horticulture held between the authorities concerned of the Government of India and the Japanese Survey Team on November 24, 1972.

Further to the visit to India of the first survey mission headed by Dr. K. Nagai in November/December 1971, the second survey team headed by Dr. Iwasa visited India in November 1972 for the purpose of having further observation tour to various horticultural areas and also for the purpose of discussing and formulating the outline of the possible collaboration project in the field of horticulture between the two countries.

1. At the meeting with the authorities concerned of the Government of India on November 17-18, 1972, the Japanese Survey Team reported that there were two ways of collaboration in the field of horticulture i.e. one on the research programme and the other on the horticultural area development programme. In this aspect, the finding of the Japanese Survey Team was that to begin with, the collaboration in the research field should be taken up, followed by an area development programme for the reason that it was most practicable, and tentative proposal was made on the following subjects:

- (1) Research on hybrid seeds production method of vegetables
- (2) Research on ecology of citrus fruits and apples

2. The Indian authorities appreciated the interesting report made by the Japanese Survey Team. Regarding the proposed collaboration to be taken up, the Indian authorities agreed to have the subject mentioned in 1 (1) above. However, they proposed to have a research-cum-demonstration type collaboration project on citrus fruits and apples aiming at further increase in production through improvement and establishment of methods of cultivation, soil conservation, plant protection, irrigation and drainage facilities, mechanization, packing, marketing, transportation etc.

3. Both the sides finally formulated the outline of the possible collaboration programmes to be taken up between the two countries as mentioned in Annexure 1 and 2, based on which, it was agreed to have further discussion for finalizing the programmes and agreement.

4. Collaboration in Citrus culture

The Japanese side were of the view that initially it would be better to exchange citrus scientists and research data and information between the two countries rather than to have co-operative works under the technical co-operation scheme.

The Indian side indicated that their requirement would be primarily in terms of a citrus agronomist and a virus pathologist.

ANNEXURE 1 : Research programme on hybrid seeds production method of vegetables

1. Fundamental Research

- (1) Study on fundamental techniques to produce hybrid seeds such as vernalization, chemical emasculation, etc.
- (2) Study on techniques of finding out, utilisation and maintenance of male-sterile, self-incompatible, gynococious or poloidy lines.

2. Applied Research

- (1) Selection of suitable and economical materials adaptive to local ecological conditions.
- (2) Study on interaction between breeding lines, and some ecological factors and cultivation techniques.

3. Laboratory facilities to be required

- (1) Inoculation chamber
- (2) Homogenizer
- (3) Pollination chamber

4. Expected effects of researches

- (1) Genetical fixation of those suitable lines mentioned in 2.(1) with the most suitable method.
- (2) Finding of combining abilities of newly released lines.
- (3) Finding of useful breeding lines, such as male-sterile, self-incompatible lines etc. which could produce hybrid seeds more economically.

REMARKS:

It might be advisable to conduct the research programme mentioned above at the Indian Agricultural Research Institute and the Institute of Horticulture Research in Bangalore. The following vegetables could be taken up initially: Cabbage, Cauliflower, Tomato, Onion, water melon and Raddish.

ANNEXURE 2 : Promotion of the temperate fruits (Apples and Peaches)

It will be useful to establish a Research-cum-Demonstration centre for the promotion of temperate fruit production and for taking up studies on improvement and demonstration of modern cultivation and post-harvest handling techniques available at present and newly established. The Centre will be supported by a sub-centre, if necessary. In conducting the Research-cum-Demonstration Centre, the Japanese side would extend its cooperation mainly to "Studies on improvement of cultivation and harvest handling techniques" while the Indian side would conduct "Demonstration".

The research programme of collaboration on Research-cum-Demonstration Centre would be as indicated below:

1. Subjects of studies

- (1) Study on interaction between ecological circumstances and growth
- (2) Study on introduction of orchard machinery and equipment
- (3) Study on cultivation methods including irrigation and drainage
- (4) Study on introduction of cable-way.

2. Area

Each about two hectares experimental field would be set aside for studies for apples and stone fruits in the Research-cum-Demonstration Centre.

3. Machinery, equipment and materials to be provided by the Japanese side

- (1) Sprayer for pesticides and herbicides, and foliar application of nutrients
- (2) Pumping set and plastic pipe for irrigation and drainage
- (3) Cable-way
- (4) Machinery for tillage and mowing
- (5) Others

4. Location

It would be desirable to decide the location after having more detailed survey

6. インド側との最終協議におけるインド側出席者

- (1) Shri P.V. Shenoi (Chairman)
Director (Foreign Aid)
Department of Agriculture
Ministry of Agriculture
- (2) Shri R.N. Gupa
Under Secretary (Foreign Aid)
Dep. of Agr., Min. of Agr.
- (3) Shri Daljit Singh
Director (Horticulture)
Dep. of Agr., Min. of Agr.
- (4) Shri T.R. Mehta
Deputy Director-General
Indian Council of Agricultural Research (ICAR)
- (5) Shri S.L. Katyal
Assistant Director-General
I.C.A.R.,
- (6) Shri R. Choudhury
Head, Division of Vegetable Crops and Floriculture
Indian Agricultural Research Institute
I.C.A.R.,
- (7) Shri R.K. Mahajan
Senior Research Officer
Ministry of External Affairs

(1 9 7 2 年 1 1 月 2 4 日、インド農業省にて)

7. インド国立園芸試験場 (バンガロール) が調査団に要請した
園芸試験場における研究協力の要請リスト

Indian Institute of Horticultural Research

Abstract of discussions with the Japanese Delegation in Horticulture

After a visit to the Horticultural Experiment Station and Research Laboratories of the Indian Institute of Horticultural Research, Hesaraghatta, discussions were held between the senior scientists of the Indian Institute of Horticultural Research and the Japanese Delegation, regarding the fields in which the two countries could co-operate. The topics are listed below:-

- (1) Exchange of germplasm in fruits, vegetables and ornamental horticulture and exchange visits of breeders of the two countries to study the germplasm in leading horticultural institutes/research stations of the two countries. The exchange of scientists may also be in other disciplines such as Pomology including Citriculture, Vegetable Crops and Ornamental Plants and also supporting disciplines like Plant Physiology, Bio-chemistry, Plant Pathology Entomology, Agronomy, Soil Science, etc. who work on horticultural crops.
- (2) Mechanisation of the Experiment Station which would include the work on standardising garden tools and implements, plant protection equipments, small garden tractors etc. The Japanese Government may set up a good workshop for this purpose and also get lot of garden tools and implements, garden tractors, Plant Protection equipments for testing under local conditions. If found necessary, these equipments may be further improved for use under local conditions.

(3) Fundamental studies in fruit tree nutrition including radio tracers techniques and fruit tree physiology:-

All the necessary sophisticated equipments required for soil and leaf analysis as also auxin-bioassay etc., may be provided by Japan. They may also depute one expert alongwith the equipments for a period of at least two years.

(4) Hybrid seed production in vegetable crops and ornamental plants:-

- a) Vegetables: 1. Cucumber; 2. Watermelon, 3. Brinjal, 4. Tomato etc.
- b) Ornamental Plants: Petunia and other flowering annuals.

(5) Setting up of irrigation technology laboratory:-

Since little work on this aspect has been done in India in fruit trees, it was considered necessary to initiate work on water requirements of tropical fruit such as banana, pine apple, citrus, papaya, mango, etc. The necessary equipment and an expert may be allocated by Japan for this purpose at least for a period of two years.

(6) There is a good scope of co-ordination in the field of Mushroom production, particularly, shiitake mushroom which is commonly grown in Japan on logs of wood. Provision of necessary cultures and technical know-how would be necessary from Japan. Necessary cultures and an expert may be allocated for this purpose for a period of 6 months.

(7) Landscape Gardening:-

The Indian Institute of Horticultural Research has got a section on Landscape Gardening. This section is to standardise the landscape plans for various regions of the country and also landscape 580 acre campus of the Institute. It would be useful to plan part of the Institute campus on Japanese style. It would be useful to have a Japanese expert on landscape gardening who with assistance of the Horticulturist (Floriculture) would lay out a Japanese garden at Hessaraghatta using the tropical plant materials. Also, it would be useful to get the Horticulturist (Floriculture) who will head the section of Landscape Gardening trained in Japan on layout designs of the Japanese Gardens and Bonsai for a period of at least one year.

(8) Setting up of a laboratory to study the pesticides residues:

It is a familiar fact that diseases are more common on horticultural plants grown under tropical conditions. As a result, the spray schedules on these crops is heavy. In some cases, like grape, as many as 40 sprays are given in a year. This heavy spraying schedule could cause health hazards due to pesticides residues. It was, therefore, considered necessary to establish Residual Toxicity Laboratory at the Indian Institute of Horticultural Research, Hessaraghatta. The Japanese Government could provide sophisticated equipments required for this purpose and an expert for a period of two years.

8. ヒマチャル・ブラディッシュ州における園芸研究活動

A BRIEF NOTE ON THE ACTIVITIES AND PROGRESS OF THE HORTICULTURAL RESEARCH IN HIMACHAL PRADESH

The Horticulturist, Department of Agriculture, Himachal Pradesh is overall Incharge of Horticultural Research Work in Himachal Pradesh.

ACTIVITIES AND PROGRESS OF WORK

The main activities of the Section fall into two categories i.e. Research and Teaching.

RESEARCH

The progress of different Research Stations and Schemes is given, as under:-

1. REGIONAL FRUIT RESEARCH STATION, MASHOBRA.

The Research Station was started in 1958 and is one of the Regional Stations set up in the country for intensification of research on imported fruit in the country. This Research Station is catering to the hilly areas of Himachal Pradesh, Punjab U.P. and J. & K.

A collection of some 461 varieties of different fruits comprising 194 of apples, 40 of pear and 33 of cherry and the rest of other temperate fruit. These varieties have been collected from within the country and abroad. The performance of the varieties is under study for selecting promising ones. Some varieties have already been found promising or have gained even commercial importance.

The work on breeding of new apple varieties, rooting of cuttings of indigenous and clonal rootstocks, fruit thinning and fruit set with the help of growth regulator and studied on control of important insect-pests are also in progress. These are expected to yield useful information in course of time.

2. HORTICULTURAL RESEARCH STATION, KULU

The Research Station was started in 1950 under the erstwhile Punjab State, but was later converted into a Progeny Orchard. In November, 1966, it comes to the Himachal Pradesh and was re-converted as a Research Station. The Station was started for carrying out Research Work on important temperate fruit. It is located in the Kulu Valley of the inferior Himalayas at an elevation of about 4,250 ft above sea level. It has extensive collections of temperate fruit apple, pear, cherry, peach, persimmon, apricot, plum and pecanutt.

In the collections, several introduced varieties have become promising and have spread to commercial plantations in the area. Besides, there are various varietal, manurial and other agronomic trials on some of these fruits. Also some breeding work is in progress in the case of apple.

3. NATIONAL HORTORIUM KOTKHAI.

This is also a station of All India importance and is a plant introduction centre for the temperate region. The total number of varieties of different fruits stands at 811 cultivated varieties, 22 ingenious species of horticultural plants, 58 Exotic species, 32 species of Malus and 4 of Prunus. Some 18 varieties of different vegetables 24 flower annuals, 6 perennials and 3 bulbous types are also in the collection. A complete series of clonal apple rootstocks is being maintained and out-of 13 is commercial types are under multiplication.

4. SCHEME FOR RESEARCH ON APPLE AND CHERRY UNDER HIGH ALTITUDES CONDITIONS (KHADRA)

With a view to conduct research work on cultivation of apple and cher under high altitude conditions (8,000'-10,000') this scheme has been recently put into operation at Khadrara since 22nd March, 1965. The requisite plant material for various trials is under preparation.

5. SCHEME FOR RESEA-RCH ON APPLE AND PEAR UNDER LOW CONDITIONS AT BAGTHAN

In order to extend cultivation of apple and pear to low altitude conditions (3,000'-4,000') this scheme has been operated at Bagthan since 22nd March, 1965. Some 37 varieties of apple have been planted in the collection to select suitable varieties for the low hills. The plant material for other trials is under preparation.

6. RAISIN GRAPES RESEARCH STATION, SHABBO

The Research Station is conducting research work on grapes especially the raisin grapes and is a station of All India importance. Some 79 varieties of grapes collected from within the country and abroad, exist in the collection for studying their performance to select promising varieties. Varietal, manurial, training and pruning trials etc. are also in progress. During the spring of 1966 some 4,500 grape vine, plants of selected varieties were propagated for distribution to the cultivators.

7. DRY FRUITS (NUTS) RESEARCH STATION, BOKTU.

This station is conducting research work on dry fruits especially Nuts like, Almond, Walnut, Pecannut etc. A collection of 247 fruit varieties comprising 35 of Walnut, 65 of Almond, 7 of Pecannut, 2 each of Pistachionut Hazelnut and 138 of other fruits exist in the collection. In the case of waln the modified forekert method of budding in the 1st weck of July gave a success upto 90% .

These methods are being utilised for propagating walnut plants vegetatively.

8. SCHEME FOR RESEARCH ON OLIVE AND POMEGRANATE AT KOTHIPURA.

Under this scheme some 37 variaties of Pomegranate and 11 of Olive been collected and are being studied with a view to select suitable varieties Plants of selected varieties of Pomegranate are being multiplied for distribution amongst the cultivators. Technique of vegetative propagation of olive has also been standardised.

9. RESEARCH ON SUB-TROPICAL FRUIT RESEARCH STATION, DHAULAKUAN

The Research Station conducting research work on sub-tropical fruit especially Citrus, Mango, Guava etc. A total of 289 varieties of different sub-tropical fruits exists in the collection for studying their performance. Some promising varieties have already been selected and are being multiplied commercial scale for distribution. Varietal, manurial rootstocks and spacing trials in sweet orange and Mandarins are in progress. A varietal trial on grape for selecting suitable varieties for the low valley areas has also been laid.

10. SCHEME FOR DEVELOPMENT OF FLORICULTURE AND ORNAMENTAL GARDENING AT MASHOBRA

This scheme is located at the Regional Fruit Research, Mashobra. A collection of some 101 varieties of annuals, 307 of bulbs and 150 of perenn has been made. The total number of varieties comes to 558. During 1966-67 a total of 3,000 seed-packets, 10,000 bulbs and 1,500 perennial plants were produced at the station for distribution.

11. TEACHING

(i) Post-graduate teaching

In addition to the research work, teaching work to M.Sc. student at the Himachal Agricultural College Solan has also been undertaken since 1966. Several students have already completed their M.Sc. (Agr.) studies through this station.

(ii) Training of Gardeners

This scheme is located at the Regional Fruit Research, St. Mashobra. One year training in practical horticulture is imparted to the trainees. Upto the end of 3rd Five Year Plan a total of 321 gardeners were trained.

9. ヒマチャル・ブラディッシュユ州立農科大学が調査団に要請した
園芸研究協力要請のリスト

PROJECTS OF THE DEPARTMENT OF HORTICULTURE FOR THE COLLABORATION OF
HORTICULTURAL SCIENTISTS FROM JAPAN

1. Studies on soil and foliar fertilization with macro and micro elements.
 - i) Foliar analyses
 - ii) Studies on uptake and translocation of micro-elements
2. Studies on the storage (cold and gas storage) and post harvest physiology of fruits.
3. Exchange of improved germ plasm.
4. Light farm machinery.
5. Fruit and vegetable technology and processing.
6. Floriculture and landscape Architecture.
7. Standardization of packaging material for apple, pear and stone fruits.
8. Fruit diseases particularly virus diseases.
9. Mushroom cultivation particularly schiitake and Hiratake.
10. Training of personnel in Horticulture.

10. アッサム地域メガラヤ州農業省が調査団に要請した
園芸協力の要請リスト

Visit of Japanese Horticulture Team. 21.11.1972

Problem of Meghalaya regarding Horticulture.

1. Vegetable Seed Production (Required Scientist.)
2. Collection, Identification of Suitable varieties of Temperate Fruits for extension to farmer orchards.
3. Citrus decline in the Border Areas. Technology required to rehabilitate Citrus Industry in Meghalaya. Need for Service of Citrus expert.
4. Processing of Fruits and Preservation.
5. Marketing in India and Foreign.
6. Meghalaya has large areas under Bamboo.- Production of Bamboo Shoots for eating - Technology required.
7. Watershed Area - 40 Kilometres from Shillong. Lyngiong for Area Development Project - Horticulture Development - There are other areas of about - 1,000 Hectares to 10,000 - available for such Projects.
8. Training and Extension of our Technical Personnel by Japanese Experts in Meghalaya for Horticulture Development.

II. 第2次インド農業研究協力実施調査団

(昭和47年12月16日～昭和47年12月29日)

／ 調査団の編成

河野 達郎

(団長兼害虫担当)

農林省農業技術研究所病理昆虫部昆虫科長

藤井 清

(植物病理担当)

農林省農業技術研究所病理昆虫部病理科細菌病才ノ研究室長

岩佐 俊吉

(園芸担当)

前茨城県園芸試験場長，茨城大学農学部講師

柏谷 和夫

(業務調整)

海外技術協力事業団農業協力部

新田 浩司

(随 行)

外務省経済協力局技術協力才2課

2. 調査団の日程

月日	旺	病 害 虫 班	園 芸 班
12.16	土	東京 → ニューデリー	同 左
17	日	ニューデリー	〃
18	月	〃 (中央政府と打合せ)	〃 (同 左)
19	火	ニューデリー → ハイデラバード	ニューデリー (中央政府と予備打合せ)
20	水	ハイデラバード } (AICRIPと	〃 (中央政府と打合せ)
21	木	〃 } 打合せ)	〃 } (中央政府と予備打
22	金	ハイデラバード → ニューデリー	〃 } 合せ)
23	土	ニューデリー (中央政府と打合せ)	同 左 (中央政府およびヒマチスル
24	日	〃	〃 、プラドイツシュ州政府と
25	月	〃	〃 打合せ)
26	火	〃 } (IAR)と打合せお	〃
27	水	〃 } よび中央政府と予	〃 (中央政府および園芸試験場
		備打合せ)	と打合せ)
28	木	〃 (中央政府と最終打	〃 (同 左)
		合せ)	
29	金	ニューデリー → 東京	〃

備 考 : 病 害 虫 班 河 野、藤 井
 園 芸 班 岩 佐、粕 谷

外務省新田事務官は12月20日から参加した。(ニューデリー)

3. 打合せ経緯

月 日 (日)	事 項
12. 18 (月)	<p>食料農業省訪問、表敬および打合せ</p> <p>インド側出席者</p> <p>Dr. T. R. Mehta Deputy Director General, ICAR</p> <p>Mr. R. N. Gupta Under Secretary, Ministry of Agr</p> <p>Mr. S. L. Katyal Assistant Director General (Horticulture) ICAR</p> <p>Dr. D. N. Srivastava Assistant Director General (Diseases and Insect pests) ICAR</p> <p>Dr. T. P. Srikharan Scientist, Entomology, ICAR</p> <p>Mr. Daljit Singh Director (Horticulture) Ministry of Agr</p> <p>(1) 日本側RD原案を提示</p> <p>(2) 調査団の日程決定</p>
12. 20 (水)	<p>園芸班、中央政府当局と打合せ</p> <p>インド側出席者</p> <p>Dr. T. R. Mehta</p> <p>Mr. S. L. Katyal</p> <p>Mr. Daljit Singh</p> <p>Dr. D. N. Srivastava</p> <p>(1) 対象野菜を6種類から4種類に減少することに合意</p> <p>(2) 野菜の対象研究機関を園芸試験場(バンガロール)ノ本にしほり、他の研究所に対しては日本人専門家のアドバイスと研究材料の提供にしほることに合意</p> <p>(3) かんきつ類についても、最終的には日本側原案で合意</p>
12. 20~21	<p>病害虫班、AICRIPと打合せ</p> <p>インド側出席者</p> <p>Dr. S. V. S. Shastri, Director, AICRIP</p> <p>Dr. V. T. John Pathologist AICRIP</p> <p>Dr. Kalode Entomologist AICRIP</p> <p>Dr. Kishan</p>

月 日 (曜)	事 項
12. 23 (土)	<p>(1) <i>Gall midge</i> 研究の詳細な打合せ ~ 双方合意</p> <p>(2) <i>Tungro Virus</i> 病研究についても協力要請 ~ 最終結論持ち越し</p> <p>中央政府当局と打合せ</p> <p>インド側出席者</p> <p>Dr. T. R. Mehta</p> <p>Mr. R. N. Gupta</p> <p>Mr. S. L. Katyal</p> <p>Mr. Daljit Singh</p> <p>Mr. Harbans Singh Director of Horticulture Himachal Pradesh</p> <p>Dr. T. P. Sriharan</p> <p>(1) 落葉果樹につき R/D原案の計画の内容は前回 Minutesの Annexure IIに述べられている内容と同じである旨を Note に明記して合意</p> <p>(2) 病害虫については A/CRIPでの打合せ事項が報告され フォサとの打合せ後に結論を出すことが確認される。</p>
12. 26 (火)	<p>インド農業研究所にて打合せ</p> <p>インド側出席者</p> <p>Dr. A. B. Joshi Director, IARI</p> <p>Dr. S. P. Raychaudri, Head of Division (Mycology) IARI</p> <p>Dr. Y. P. Rab. Mycology Division, IARI</p> <p>Dr. N. D. Misra " " "</p> <p>Dr. D. N. Srivastava</p> <p>Dr. T. P. Sriharan</p> <p>(1) インド側はカタックの CRR/を Seasonal Sub-Center として明記することを強く主張</p> <p>(2) この時点で 日本側は CRR/を Seasonal Sub-Center とすることは R/D原案には明記されていないが、この考え方は予備調査団の時からあったので Note にその旨述べることは差しつかえないと判断する。</p>

月 日 (旺)	事 項
12. 27 (水)	<p>午前 中央政府当局と打合せ</p> <p>インド側出席者</p> <p>Mr. Daljit Singh</p> <p>Mr. S. L. Katyal</p> <p>Dr. Prem Nath Head of Division (Vegetable)</p> <p> Institute of Horticulture Research ICAR</p> <p>Dr. D. N. Srivastava</p> <p>Dr. S. V. S. Shastry</p> <p>午後、インド農業研究所にて打合せ</p> <p>インド側出席者</p> <p>Dr. S. P. Raychaudri</p> <p>Dr. Y. P. Rao</p> <p>Dr. N. D. Misra</p> <p>Dr. S. Pradhan, Head of Division (Entomology) IARI</p> <p>Dr. D. N. Srivastava</p> <p>Dr. T. P. Sriharan</p> <p>Dr. S. V. S. Shastry</p> <p>夕、中央政府当局と予備打合せ</p> <p>インド側出席者</p> <p>Mr. R. N. Gupta</p> <p>Dr. D. N. Srivastava</p> <p>Dr. T. P. Sriharan</p> <p>Dr. S. V. S. Shastry</p> <p>(1) 園芸については 特に変更なし</p> <p>(2) 本日に到り、インド側はCRR1を単にSeasonal Sub-Centerにと とめず、Applied Researchの研究場所としてIARI, AICRIP と同格にAnnexure Iの表中に 明記することを主張</p> <p>(3) しかし、この時点では 日本側は完全に同意したわけではないが、 CRR1をAnnexure Iの表中に入れることは認めるが、日本人長期 専門家は、IARI, AICRIPのみに派遣することをNoteすることによ って CRR1は実質Seasonal Sub-Centerにすることでほぼ同意</p>

月 日 (証)	事 項
12. 28 (木)	<p>中央政府当局と最終打合せ</p> <p>インド側出席者</p> <p>Dr. M. S. Swaminathan Director General, ICAR</p> <p>Dr. T. R. Mehta</p> <p>Mr. R. N. Gupta</p> <p>Mr. Daljit Singh</p> <p>Dr. D. N. Srivastava</p> <p>Mr. S. L. Katyial</p> <p>Dr. Prem Nath</p> <p>Dr. T. P. Sriharan</p> <p>Dr. S. V. S. Shastri</p> <p>(1) ICAR 会長出席のもとに最終の打合せが行なわれた。</p> <p>(2) RD 原案に対し 本文および園芸関係に対しては殆ど問題なく同意された。</p> <p>(3) 病害虫に関しては、Dr. M. S. Swaminathan 会長から CRR1 を完全に IARI, AICRIP と同格に扱うよう強く主張された。</p> <p>(4) これに対し 日本側は昨日までほぼ同意した事項(前ページ(3))の線まで妥協したが 同会長はその主張を変えず 双方同意に達し得なかった。</p>

4. 調査団がインド側に提示した合意議事録案

RECORD OF DISCUSSIONS ON
THE TECHNICAL COOPERATION FOR
THE AGRICULTURAL RESEARCH COOPERATION PROJECT

(DRAFT)

In pursuance of the investigations carried out by the preliminary agricultural survey team headed by Mr. Kotaro Nagai that visited India in November 1971, and the horticulture survey team headed by Dr. Shunkichi Iwasa that visited India in November 1972, which outlined the basic principles of the proposed cooperation between Japan and India for the Joint Agricultural Research Cooperation Project, the third agricultural survey team organized by Overseas Technical Cooperation Agency and headed by Mr. Tatsuro Kono, visited India from December 16 to December 28, 1972, for the purpose of working out the details of the proposed cooperation between the two countries on the Japan-India Joint Agricultural Research Cooperation Project. The team conducted a series of surveys and discussions with the authorities concerned of the Government of India and consequently the two parties reached the understandings as recorded hereunder.

These understandings are not binding legally either on the Government of Japan or on the Government of India.

However, final decision will be made, based upon the official reviews of the said understandings, in the form of an agreement between the two Governments concerning the implimentation of the Project.

New Delhi

December, 1972

Mr. Tatsuro Kono
Head of the Japanese Survey Team,
Overseas Technical Cooperation
Agency, Japan

RECORD OF DISCUSSIONS

1. (1) For the purpose of stabilizing rice production and promoting horticultural production, the two countries will jointly carry out a research project for establishment of the methods of forecasting outbreak of rice diseases and insect pests, and for horticultural crops. The project will be called as Japan-India Joint Research Project (hereinafter referred to as "the Project") and will consist of two sub-projects. One is the sub-project for research on establishment of methods of forecasting outbreak of rice diseases and insect pests, the other is the sub-project for research on horticulture.

The contents of the Project will be the following:

- (a) Research work on the themes as listed in Annexure I;
- (b) Exchange of information, samples, materials and research reports;
- (c) Exchange of researchers and other personnel; and
- (d) Other activities to be agreed upon between the authorities concerned of the two countries.

(2) Operational Work Plans of the Project will be formulated by the Joint Committees referred to in item II.

2. (1) In accordance with the laws and regulations in force in Japan, the Japanese authorities concerned will take necessary measures to provide at their own expense the services of Japanese experts as listed in Annexure II.

(2) In accordance with laws and regulations in force in Japan, some additional experts on short term assignment may be dispatched through the normal procedures of the Government of Japan when necessity arises.

3. The Japanese experts referred to in item 2. above and their families will be granted privileges, exemptions and benefits as admissible to experts assigned to India under the Colombo Plan Technical Cooperation Scheme and also will be granted privileges, exemptions and benefits no less favourable than those granted in India to the experts of third countries or the experts of international organizations such as the United Nations serving under similar circumstances.

4. The Indian authorities concerned undertake to bear claims, if any arises, against the Japanese experts engaged in the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in India covered by the present Record of Discussions, except for those claims arising from willful conducts or gross negligence of the Japanese experts.

5. In accordance with laws and regulations in force in Japan, the Japanese authorities concerned will take necessary measures to provide at their own expense such equipment, machinery, vehicles, instruments, tools, spare parts and other materials as listed in Annexure III.

6. In accordance with laws and regulations in force in Japan, the Japanese authorities concerned will take necessary measures to receive Indian researchers and research administrators engaged in the Project for training and study tours in Japan as well as for symposia or other similar meetings to be held in Japan, through the normal procedures of the Government of Japan required therefor.

7. The articles referred to in Annexure III will become the property of the Government of India upon being delivered c.i.f. at the port of disembarkation to the Indian authorities concerned. The articles referred to above will be utilized exclusively for the implementation of the Project.

8. The Indian authorities concerned will take necessary measures to provide at their own expense:

(1) The services of Indian researchers and other personnel including administrative personnel as listed in Annexure IV;

(2) Land and buildings as well as incidental facilities as listed in Annexure V;

(3) Suitable furnished housing accommodations for the Japanese experts and their families;

(4) Transportation facilities for the Japanese expert's official travels within India;

(5) Supply or replacement of equipment, machinery, vehicles, instruments, tools, spare parts and other materials necessary for the implementation of the Project other than those provided by the Japanese authorities concerned under item 5.

9. The Indian authorities concerned will take necessary measures to meet:

(1) All running expenses necessary for the implementation of the Project;

(2) Customs duties and any other charges imposed in India in respect of the articles as listed in Annexure III;

(3) Expenses necessary for the transportation within India for the articles as listed in Annexure III as well as for their installation, operation and maintenance thereof.

10. The Indian authorities concerned will be responsible for the administration and implementation of the Project, and the Japanese experts will provide necessary technical guidance and advice for the Project.

11. For the successful implementation of the Project, two Joint Project Committees will be established as specified in Annexure VI. The Committee may appoint sub-committee to deal with specific problem, if necessary.

12. For the successful implementation of the Project, close relationship will be maintained between the Indian agricultural research institutions and Japanese agricultural research institutions.

13. The authorities concerned of the two countries will consult with each other from time to time concerning the successful implementation of the Project.

14. The Project will be implemented for a period of five years.

Annexure I

Research work on the themes and place

1. The Sub-project of research on forecasting outbreak of rice diseases and insect pests.

research themes	place
<p>A. Research on stem borer</p> <p>Fundamental Research; Physiological study of hibernating generation</p> <p>Applied Research; Study on population dynamics during crop season, relating to climatic factors such as rainfall, temperature and humidity to population change</p>	<p>Indian Agricultural Research Institute (New Delhi)</p>
<p>B. Research on leafhopper tungro</p> <p>Fundamental Research;</p> <p>(1) Detection and characterization of virus (purification, serology and electron microscopy)</p> <p>(2) Host-range and symptomatology of virus diseases</p> <p>Applied Research; Study on migratory behaviour of insect life cycles and factors governing their population dynamics ecotypes and mode of hibernation</p>	<p>Indian Agricultural Research Institute (New Delhi)</p>
<p>C. Research on bacterial leaf blight</p> <p>Fundamental Research;</p> <p>(1) Bacteriophage technique as a tool for detecting bacterial population</p> <p>(2) Pathogenic variability in pathogenic bacteria</p>	<p>Indian Agricultural Research Institute (New Delhi)</p>

research themes	place
<p>(3) Bacterial physiology, serology and electron microscopy in relation to physiological specialization of bacteria</p> <p>Applied Research;</p> <p>(1) Screening test of resistant varieties</p> <p>(2) Role of infected seeds and weed hosts to diseases outbreak</p> <p>(3) Factors influencing blight and wilt phase of the diseases</p> <p>(4) Multiplication of bacteria in rhizosphere of their crops</p> <p>(5) Loss in grain yield of rice caused by diseases</p>	
<p>D. Research on gall midge</p> <p>Fundamental Research;</p> <p>(1) Study on biotypes and their genetic differences intensively in one location under controlled growth chamber condition</p> <p>(2) Study on mechanisms of host resistance with emphasis on plant and insect physiology interaction</p> <p>Applied Research;</p> <p>(1) Study on population dynamics during crop season relating to climatic factors such as rainfall, temperature and humidity to population change</p> <p>(2) Study on off-season biology to determine mode and locations of survival and role of alternative hosts</p>	<p>All India Coordinated Rice Improvement Project (Hyderabad)</p>

Note: The research works will be implemented in order to establish the practical techniques of national level in the field of forecasting outbreak of rice diseases and insect pests.

2. The Sub-project of research on horticulture

research themes	place
A. Research on hybrid seeds production method of vegetables	Institute of Horticulture Research (Bangalore)
Fundamental Research;	
(1) Study on fundamental techniques to produce hybrid seeds such as varnalization and chemical emasculation	
(2) Study on techniques of finding out utilization and maintenance of male-sterile, self-incompatible gynoeceious or poliploidy	
Applied Research;	
(1) Study on selection of suitable and economical materials adaptive to local ecological conditions	
(2) Study on interaction between breeding lines and some ecological factors and cultivation techniques	
B. Research on cultivation method of citrus	Institute of Horticulture Research (Bangalore)
(1) Study on interaction between ecological circumstances and growth	
(2) Study on citrus propagation method	
C. Research on cultivation method of deciduous fruit trees	Research-cum-Demonstration Center (Simla)
(1) Study on interaction between ecological circumstances and growth	
(2) Study on crop management of orchard	

Note: The extension and demonstration works resulted from the research works will be conducted by Indian side.

Annexure II

List of Japanese experts

1. The Sub-project of research on forecasting outbreak of rice diseases and insect pests

	Number
(1) Leader	
(2) Bacteriologist	
(3) Entomologist	
(4) Virologist	
(5) Virus entomologist	
(6) Plant physiologist	
(7) Agricultural climatologist	
Total	7

2. The Sub-project of research on horticulture

	Number
(1) Vegetable breeder	
(2) Pomologist (citrus)	
(3) Pomologist (deciduous fruit tree)	
Total	4

Note: (1) In the Sub-project of research on horticulture, two team leaders will be individually nominated by the Japanese authorities concerned from the experts who will be stationed in the Institute of Horticulture Research in Bangalore and at the Research-cum-Demonstration Center in Simla, and one of them will serve concurrently the Sub-project leader of horticulture mentioned above.

- (2) The field of experts may be changeable with the progress of the Project implementation after discussion of the authorities concerned of the two countries.

Annexure III

List of equipment, machinery, vehicles, instruments,
tools, spare parts and other materials

- (1) Equipment including electronical articles, instruments, tools, spare parts and other materials for laboratory work
- (2) Equipment, machinery, instruments, tools, spare parts and other materials for field work
- (3) Materials for research work
- (4) Vehicles
- (5) Fertilizer, pesticide and materials for chemical control
- (6) Audio-visual aids and articles for office work
- (7) Books and other necessary printed matters

- Note: (1) The authorities concerned of the two countries will jointly formulate the specific list of the articles on the basis of the Operational Work Plans and the recommendation of the Joint Committees.
- (2) The Indian authorities concerned will accordingly arrange for expeditious clearance of the articles.

Annexure IV

List of Indian technical staff,
administrative and other personnel

1. The Sub-project of research on forecasting outbreak of rice descases and insect pests

(1) Category of counterpart researchers

Senior Entomologist (Stem borer)	1
Junior Entomologist (" ")	3
Virus Pathologist (Leafhopper-Tungro)	1
Virus Entomologist (" ")	2
Senior Research assistant (")	2
Senior Virologist (")	1
Junior Research assistant (")	2
Plant Bacteriologist (Bacterial Leaf Blight)	1
Assistant Plant Bacteriologist (")	1
Plant Breeder (Gall midge)	1
Insect Geneticist (")	1
Junior Entomologist (")	1
Junior Plant Physiologist (")	1
Junior Climatologist (")	1
Other junior supporting staff (")	

(2) Category of personnel

Superintendent	2
Typist	2
Messenger	2
Animal House Attendant	2
Driver	
Labourer	12

2. The Sub-project of research on horticulture

(1) Category of counterpart researchers

Senior Breeder (Vegetables)	1
Senior Horticulturist (Deciduous fruits)	2
Senior Horticulturist (Citrus)	2

Junior Breeder (tomato, onion, radish, water melon)	4
Junior researcher (diseases and insect pests of vegetables)	1
Assistant Horticulturist (vegetables)	8
(deciduous fruits)	2
(citrus)	1

(2) Category of personnel

Superintendant	(Bangalore 1, simla 1)	2
Messenger	(Bangalore 1, simla 1)	
Typist	(Bangalore 1, simla 1)	2
Driver	(Bangalore 2, simla 2)	4
Labourer	(Vegetables 20, deciduous fruit 6, citrus 3)	29

Annexure V

List of land, buildings and other facilities

1. The Sub-project of research on forecasting outbreak of rice diseases and insect pests

A. At IARI in New Delhi

- | | |
|------------------------|--|
| (1) Office | |
| (2) Laboratory | 30m ² × 2, 50m ² × 1 |
| (3) Glass house | 200m ² × 1 |
| (4) Experimental field | 30 are |

B. At AICRIP in Hyderabad

- | | |
|------------------------|-----------------------|
| (1) Office | |
| (2) Laboratory | 30m ² × 3 |
| (3) Glass house | 100m ² × 1 |
| (4) Experimental field | 30 are |

C. Experimental field for research

2. The Sub-project of research on horticulture

D. Institute of Horticulture Research in Bangalore

- | | |
|----------------------------------|---|
| (1) Office | 40m ² × 1 |
| (2) Laboratory | 50m ² × 2, 100m ² × 1 |
| (3) Work room for field research | 100m ² × 2 |
| (4) Glass house and green house | 200m ² , 1000m ² |
| (5) Experimental field | 3 ha (vegetable)
1.5 ha (citrus) |

E. Research-cum-Demonstration Center in Simla

- | | |
|---------------------------------|------------------------|
| (1) Office | } 50m ² × 1 |
| (2) Laboratory | |
| (3) Glass house and green house | 100m ² × 1 |
| (4) Experimental field | 4 ha |

Annexure VI

Composition of the Joint Committee

1. Joint Committee of the Sub-project of research on forecasting outbreak

Indian side	Japanese side
(1)	(1) Japanese Sub-project leader
(2)	(2) Representative of Japanese experts
(3)	(3) Chief adviser of Indo-Japanese Agricultural Extension Centers
(4)	(4) Representative of the Overseas Technical Cooperation Agency, JAPAN

2. Joint Committee of the Sub-project of research on horticulture

Indian side	Japanese side
(1)	(1) Japanese Sub-project leader
(2)	(2) Representative of Japanese experts
(3)	(3) Chief adviser of Indo-Japanese Agricultural Extension Centers
(4)	(4) Representative of the Overseas Technical Cooperation Agency, JAPAN

- Note:
- (1) A chairman of the Joint Committee will be conducted by Indian side.
 - (2) Any other experts from both sides may attend the meetings of the Joint Committee if necessity arises.
 - (3) An official of the Embassy of Japan may attend the meetings of the Joint Committee as an observer.

5. 12月28日(1972年)に調査団がインド政府当局と
検討した合意議事録案

RECORD OF DISCUSSIONS ON
THE TECHNICAL COOPERATION FOR
THE AGRICULTURAL RESEARCH COOPERATION PROJECT

(DRAFT)

In pursuance of the investigations carried out by the preliminary agricultural survey team headed by Mr. Kotaro Nagai that visited India in November 1971, and the horticulture survey team headed by Dr. Shunkichi Iwasa that visited India in November 1972, which outlined the basic principles of the proposed cooperation between Japan and India for the Joint Agricultural Research Cooperation Project, the third agricultural survey team organized by Overseas Technical Cooperation Agency and headed by Mr. Tatsuro Kono, visited India from December 16 to December 28, 1972, for the purpose of working out the details of the proposed cooperation between the two countries on the Japan-India Joint Agricultural Research Cooperation Project. The team conducted a series of surveys and discussions with authorities concerned of the Government of India and consequently the two parties reached the understandings as recorded hereunder.

These understandings are not binding legally either on the Government of Japan or on the Government of India.

However, final decision will be made, based upon the official reviews of the said understandings, in the form of an agreement between the two Governments concerning the implementation of the Project.

New Delhi

December, 1972

Mr. Tatsuro Kono
Head of the Japanese Survey Team,
Overseas Technical Cooperation Agency,
Japan

RECORD OF DISCUSSIONS

1. (1) For the purpose of stabilizing rice production and promoting horticultural production, the two countries will jointly carry out a research project for establishment of the methods of forecasting outbreak of rice diseases and insect pests, and for horticultural crops. The project will be called as Japan-India Joint Research Project (hereinafter referred to as "the Project") and will consist of two sub-projects. One is the sub-project for research on establishment of methods of forecasting outbreak of rice diseases and insect pests, the other is the sub-project for research on horticulture.

The contents of the Project will be the following:

- (a) Research work on the themes as listed in Annexure I;
- (b) Exchange of information, samples, materials and research reports;
- (c) Exchange of researchers and other personnel; and
- (d) Other activities to be agreed upon between the authorities concerned of the two countries.

(2) Operational Work Plans of the Project will be implemented by the Joint Committees referred to in item 11.

2. (1) In accordance with the laws and regulations in force in Japan, the Japanese authorities concerned will take necessary measures to provide at their own expense the services of Japanese experts as listed in Annexure II.

(2) In accordance with laws and regulations in force in Japan, some additional experts on short term assignment may be dispatched through the normal procedures of the Government of Japan when necessity arises.

3. The Japanese experts referred to in item 2. above and their families will be granted privileges, exemptions and benefits as admissible to experts assigned to India under the Colombo Plan Technical Cooperation Scheme and also will be granted privileges, exemptions and benefits no less favourable than those granted in India to the experts of third countries or the experts of international organizations such as the United Nations serving under similar circumstances.

4. The Indian authorities concerned undertake to bear claims, if any arises, against the Japanese experts engaged in the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in India covered by the present Record of Discussions, except for those claims arising from willful conducts or gross negligence of the Japanese experts.

5. In accordance with laws and regulations in force in Japan, the Japanese authorities concerned will take necessary measures to provide at their own expense such equipment, machinery, vehicles, instruments, tools, spare parts and other materials as listed in Annexure III.

6. In accordance with laws and regulations in force in Japan, the Japanese authorities concerned will take necessary measures to receive Indian researchers and research administrators engaged in the Project for training and study tours in Japan as well as for symposia or other similar meetings to be held in Japan, through the normal procedures of the Government of Japan required therefor.

7. The articles referred to in Annexure III will become the property of the Government of India upon being delivered c.i.f. at the port of disembarkation to the Indian authorities concerned. The articles referred to above will be utilized exclusively for the implementation of the Project.

8. The Indian authorities concerned will take necessary measures to provide at their own expense:

(1) The services of Indian researchers and other personnel including administrative personnel as listed in Annexure IV;

(2) Land and buildings as well as incidental facilities as listed in Annexure V;

(3) Suitable furnished housing accommodations for the Japanese experts and their families;

(4) Transportation facilities for the Japanese expert's official travels within India;

(5) Supply or replacement of equipment, machinery, vehicles, instruments, tools, spare parts and other materials necessary for the implementation of the Project other than those provided by the Japanese authorities concerned under item 5.

9. The Indian authorities concerned will take necessary measures to meet:

(1) All running expenses necessary for the implementation of the Project;

(2) Customs duties and any other charges imposed in India in respect of the articles as listed in Annexure III;

(3) Expenses necessary for the transportation within India for the articles as listed in Annexure III as well as for their installation, operation and maintenance thereof.

10. The Indian authorities concerned will be responsible for the administration and implementation of the Project, and the Japanese experts will provide necessary technical guidance and advice for the Project.

11. Planning the precise programme of work, evolving priority and ensuring successful implementation of the Project, two Joint Project Committees will be established as specified in Annexure VI. The Committee may appoint sub-committee to deal with specific problem, if necessary.

12. For the successful implementation of the Project, close relationship will be maintained between the Indian agricultural research institutions and Japanese agricultural research institutions.

13. The authorities concerned of the two countries will consult with each other from time to time concerning the successful implementation of the Project.

14. The Project will be implemented for a period of five years.

Annexure I

Research Project and places

1. The Sub-project on forecasting outbreak of rice diseases and insect pests.

research themes	place
A. Research on stem borer	--
(1) Fundamental Research; Physiological study of hibernating generation and ecology of development.	I.A.R.I.
(2) Applied Research; Study on population dynamics during crop season, relating to climatic factors such as rainfall, temperature and humidity to population change.	A.I.C.R.I.P., C.R.R.I. and I.A.R.I.
B. Research on leafhopper tungro	--
Fundamental Research;	
(1) Detection and characterization of virus, purification, serology and electron microscopy, and strain variation in the RTV.	I.A.R.I.
(2) Strain variation and host specialisation in RTV.	A.I.C.R.I.P.
(3) Applied Research; Study on migratory behaviour, life cycles and factors governing populations of the insect, dynamics, ecotypes and mode of hibernation.	A.I.C.R.I.P., C.R.R.I. and I.A.R.I.
C. Research on bacterial leaf blight	
Fundamental Research;	
(1) Bacteriophage technique as a tool for detecting bacterial population.	A.I.C.R.I.P.
(2) Variability in the pathogen including physiology, serology and electron microscopy in relation to physiologic specialization of the bacterium	I.A.R.I.

research themes	place
Applied Research;	
(1) Testing of resistant varieties	C.R.R.I., A.I.C.R.I.P. and I.A.R.I.
(2) Role of infected seeds in the outbreak of the disease	I.A.R.I.
(3) Role of weed hosts in the outbreak of the disease	I.A.R.I., C.R.R.I. and A.I.C.R.I.P.
(4) Factors influencing blight and wilt phases of the disease	I.A.R.I. and A.I.C.R.I.P.
(5) Multiplication of bacteria in the rhizosphere of other crops	I.A.R.I.
D. Research on gall midge	
Fundamental Research;	
	A.I.C.R.I.P.
(1) Study on biotypes and their genetic differences under controlled growth chamber condition.	
(2) Study on mechanisms of host resistance with emphasis on plant and insect physiology interaction.	
Applied Research;	
	A.I.C.R.I.P.
(1) Study on population dynamics during rice crop season relating to climatic factors such as rainfall, temperature and humidity to population change.	
(2) Study on off-season biology to determine mode and locations of survival and role of alternative hosts.	

Note: (i) The research work will be carried out in order to establish practical techniques in the field of forecasting outbreak of rice diseases and insect pests at national level.

(ii) Although research work will be carried out at 3 places, the visiting scientists will be located either at Delhi ~~or~~ Hyderabad on long term basis.
OR.

2. The Sub-project of research on horticulture

research themes	place
A. Research on hybrid seeds production method of vegetables (tomato, onion, radish, water-melon)	Indian Institute of Horticultural Research, Hessarghatta
Fundamental Research;	(Bangalore)
(1) Study on fundamental techniques to produce hybrid seeds such as varnalization and chemical emasculation	
(2) Study on techniques of finding out utilization and maintenance of male-sterile, self-incompatible gynoeocious or poliploidy	
Applied Research;	
(1) Study on selection of suitable and economical materials adactive to local ecological conditions	
(2) Study on interaction between breeding lines and some ecological factors and cultivation techniques	
B. Research on cultivation method of citrus	Indian Institue of Horticultural Research, Hessarghatta
(1) Study on interaction between ecological circumstances and growth	(Bangalore)
(2) Study on citrus propagation method	
C. Research on cultivation method of deciduous fruit trees	Research-cum-Demonstration Center (Simla)
(1) Study on interaction between ecological circumstances and growth	
(2) Study on crop management of orchard	

Note: (1) The extension and demonstration works resulted from the research works above will be conducted by Indian side.

(2) The programme of work will be as outlined in Annexure II of the Minutes of Discussions held on November 24, 1972.

Annexure II

List of Japanese experts

1. The Sub-project of research on forecasting outbreak of rice diseases and insect pests

	Number
(1) Leader	1
(2) Plant Pathologist (BLB)	1
(3) Plant Pathologist (RTV)	1
(4) Entomologist (Borer)	1
(5) Entomologist (Gall midge)	1
(6) Entomologist (Leaf hopper)	1
(7) Virologist (Leaf hopper)	1
Total	7

2. The Sub-project of research on horticulture

	Number
(1) Vegetable breeder	1
(2) Pomologist (citrus)	1
(3) Pomologist (deciduous fruit tree)	2
Total	4

Note: (1) In the Sub-project of research on horticulture, two team leaders will be individually nominated by the Japanese authorities concerned from the experts who will be stationed in the Institute of Horticulture Research in Bangalore and at the Research-cum-Demonstration Center in Simla, and one of them will serve concurrently the Sub-project leader of horticulture mentioned above.

(2) The field of experts may be changeable with the progress of the Project implementation after discussion of the authorities concerned of the two countries.

Annexure III

List of equipment, machinery, vehicles, instruments, tools,
spare parts and other materials

- (1) Equipment including electronical articles, instruments, tools, spare parts and other materials for laboratory work
- (2) Equipment, machinery, instruments, tools, spare parts and other materials for field work
- (3) Germplasm and plant materials
- (4) Specialised mobile unit
- (5) Fertilizer, pesticide and materials for chemical control
- (6) Audio visual aids for training and demonstration and articles for office work
- (7) Books and other necessary printed matters.

- Note: (1) The authorities concerned of the two countries will jointly formulate the specific list of the articles on the basis and on the recommendation of the Joint Committees.
- (2) The Indian authorities concerned will accordingly arrange for expeditious clearance of the articles.

Annexure IV

List of Indian technical staff,
administrative and other personnel

1. The Sub-project of research on forecasting outbreak of rice diseases and insect pests.

(1) Category of counterpart researchers:

Senior Entomologist (Borer)	1
Senior Research Assistant	1
Senior Entomologist (Gall midge)	1
Senior Research Assistants	3
Senior virologist (Fundamental work)	1
Senior Research Assistant	1
Senior Virologist (Applied work)	1
Senior Research Assistant	1
Senior Virus Entomologist	1
Senior Research Assistant (Virus Entomologist)	1
Senior Plant Bacteriologist	2 (one each at Delhi and Hyderabad)
Senior Research Assistants	2 (one each at Delhi and Hyderabad)

(2) Category of personnel

Superintendent
Typist
Messenger
Animal House Attendant
Driver
Labourer

2. The Sub-project of research on horticulture

(1) Category of counterparts researchers:

Senior Breeder (vegetables)	1
Senior Horticulturist (deciduous fruits)	2
Senior Horticulturist (citrus)	1
Junior Breeder (tomato, onion, radish, water melon)	4
Senior Research Assistant (vegetables)	4
" (deciduous fruits)	2
" (citrus)	1

(2) Category of personnel:

Superintendent	Bangalore 1, Simla 1	2
Messenger		
Typist	Bangalore 1, Simla 1	2
Driver	Bangalore 2, Simla 2	4
Labourer (vegetable 20, deciduous fruit 6, citrus 3)		29

Annexure V

List of land, buildings and other facilities

1. The project of research on forecasting outbreak of rice diseases and insect pests

A. At IARI in New Delhi

- (1) Office
- (2) Laboratory 30m² × 2, 50m² × 1
- (3) Glass house 200m² × 1
- (4) Experimental field 30 acre

B. At AICRIP in Hyderabad

- (1) Office
- (2) Laboratory 30m² × 3
- (3) Glass house 100m² × 1

C. Experimental field for research

2. The Project of research on horticulture

D. Institute of Horticulture Research in Bangalore

- (1) Office 40m² × 1
- (2) Laboratory 50m² × 2, 100m² × 1
- (3) Work room for field research 100 m² × 1
- (4) Glass house and Green house 200 m² × 1, 1,000 m² × 1
- (5) Experimental field 3 ha (vegetable)
1.5 ha (citrus)

E. Research-cum-Demonstration Center in Simla

- (1) Office 50 m² × 1
- (2) Laboratory
- (3) Glass house and Green house 50 m² × 2
- (4) Experimental field 4 ha

Annexure VI

Composition of the Joint Committee

1. Joint Committee of the Project of research on forecasting outbreak of rice diseases and insect pests.

Indian side	Japanese side
(1) Deputy Director General (C.S.)	(1) Japanese Sub-project leader
(2) Project Coordinator, Rice	(2) Representative of Japanese experts
(3) Head of Division of Entomology/ Plant Pathology Indian Agricultural Research Institute	(3) Chief adviser of Indo-Japanese Agricultural Extension Centers
(4) Assistant Director General (P.P.)	(4) Representative of the Overseas Technical Cooperation Agency, JAPAN
(5) A Representative of Department of Agriculture	
(6) Director General of C.R.R.I.	

2. Joint Committee of the Project of research on horticulture

Indian side	Japanese side
(1) Deputy Director General (C.S.)	(1) Japanese Sub-project leader
(2) Director, Indian Institute of Horticultural Research, Hessarghatta	(2) Representative of Japanese experts
(3) Director, Horticultural, Himachal Pradesh	(3) Chief adviser of Indo-Japanese Agricultural Extension Centers
(4) Representative of Department of Agriculture	(4) Representative of the Overseas Technical Cooperation Agency, JAPAN
(5) Assistant Director General (Horticulture)	

- Note: (1) Director General of I.C.A.R. will be a chairman of the Joint Committee.
- (2) Any other experts from both side may attend the meetings of the Joint Committee if necessity arises.
- (3) An official of the Embassy of Japan may attend the meetings of the Joint Committee as an observer.

6. インド農業研究所病理部での打合せ事項

Some important points raised as a result of the discussion with Dr. T. Kono and Dr. Fujii who came from Japan for discussing about the Technical Cooperation Project for Agricultural Research Collaborative Programme specially in respect of investigations on tungro yellow dwarf as well as bacterial blight of rice with special reference to forecasting these diseases.

In the morning the discussion was held between the above stated two scientists alongwith Dr. S. P. Raychaudhuri, Head of the Division of Mycology and also Dr. Y. P. Rao and Mr. M. D. Mishra who are working in the rice disease project. In the afternoon the whole team including horticulturists as well as Mr. Nishiwaki, Second Secretary, Agricultural, Japan Embassy the meeting was held when Dr. A. B. Joshi, Director, IARI had also kindly come to give valuable suggestions and advice regarding the project.

Dr. Joshi briefly summarised the nature of work done at the IARI Centre and Dr. Raychaudhuri mentioned about the importance of such collaborative work between Japanese Experts on the one hand and Indian counter parts who are team leaders and actual workers on the other hand specially made a case for collaboration between CRRI, ACCRIP and the IARI. It was generally agreed that CRRI being the main rice research institute under the ICAR where large scale varietal resistance tests survey work could be done for the Eastern part of the country. A seasonal centre can be established at the CRRI with the existing facilities. AICRIP will be main centre for gall midge research while for stem borer, tungro and yellow dwarf diseases of rice as well bacterial blight of rice IARI will be the main centre. A seasonal sub centre at AICRIP for varietal resistance work for Southern part of India can be included in the project in respect of leaf hopper and the Tungro complex and at the CRRI for stem borer, leaf hopper as well as bacterial leaf blight a seasonal sub centre can be established primarily for survey work in the eastern part of the country in respect of the diseases as well as varietal resistance tests. All the fundamental work like ultrathin sectioning, electron microscopy, purification and serological studies with the virus as well as fluorescent microscope for conducting the virus vector studies will be conducted at the IARI and the fundamental work concerning stem borer also will be conducted at the IARI subject to the approval of Dr. S. Pradhan, Head of the Division of Entomology, IARI.

Dr. Y. P. Rao also brought to the notice of the group that work on bacterial streak of rice may also be included in the contemplated cooperative project.

There was a discussion about the exchange of leaders and scientists from both sides i.e. from Japan to India and Indian to Japan to work in both countries and survey the work incidentally mentioned by Dr. Fujii. Dr. Raychaudhuri suggested the name of Dr. Socho Nasu who is well reputed Entomologist and Virologist to come at least for a short term to initiate the work in India as early as possible which will be followed by the other scientists. In discussing as far as IARI centre is concerned also for electron microscope, ultrathin sectioning as well as for serological work some virus Pathologists will be deputed to the IARI for fundamental work.

It was also stated that for Senior Scientists a short term period i.e. 6-8 weeks should be enough while for other workers comparatively younger and new in the field the tenure of the training period should be atleast for 6 months.

While discussing about the facilities to be provided for work at IARI already mention has been made in Annexure V (Page of record of the discussion on the technical cooperation) and following items have been included

- i) Office of the Expert
- ii) Laboratories (2)
- iii) Glasshouse (1) 200 x 1
- iv) Experimental field instead of 30 acres it should be 30 acres since such a big area may not be available at the IARI for this kind of experimental work
- v) Animal house
- vi) Insectary) Air conditioned

In addition to some of the other equipments like Hitachi Electron Microscope and Ultracentrifuge, spectrophotometer, at least four growth chambers, Thermohygrographs, Dew records, Incubators, Light microscope, Electric balance (Metler etc.) Lyophilizing equipment, Electronic Calculating Machine, Germicidal (UV) lamps will be required for virus and bacterial work.

Dr. Joshi, Director of the Institute took active part in the discussion and was fully in agreement with such cooperative work and expressed that such project will be more helpful for both horticulture as well as for disease forecasting. The meeting was terminated with thanks offered by the Director of the IARI and the leader of the team who came from Japan and the meeting was held practically during the whole day of the 26th December, 1972.

7. 1月18日(1973年)インド側が提示した合意議事録案

RECORD OF DISCUSSIONS ON
THE TECHNICAL COOPERATION FOR
THE AGRICULTURAL RESEARCH COOPERATION PROJECT

(DRAFT)

In pursuance of the investigations carried out by the preliminary agricultural survey team headed by Mr. Kotaro Nagai that visited India in November 1971, and the horticulture survey team headed by Dr. Shunkichi Iwasa that visited India in November 1972, which outlined the basic principles of the proposed cooperation between Japan and India for the Joint Agricultural Research Cooperation Project, the third agricultural survey team organized by Overseas Technical Cooperation Agency and headed by Mr. Tatsuro Kono, visited India from December 16 to December 29, 1972, for the purpose of working out the details of the proposed cooperation between the two countries on the Japan-India Joint Agricultural Research Cooperation Project. The team conducted a series of surveys and discussions with the authorities concerned of the Government of India and consequently the two parties reached the understandings recorded hereunder.

These understandings are not binding legally either on the Government of Japan or on the Government of India.

However, final decision will be made, based upon the official reviews of the said understandings, in the form of an agreement between the two Governments concerning the implementation of the Project.

New Delhi

December, 1972

Mr. Tatsuro Kono
Head of the Japanese Survey Team,
Overseas Technical Cooperation
Agency, Japan

RECORD OF DISCUSSIONS

1. (1) For the purpose of stabilizing rice production and promoting horticultural production, the two countries will jointly carry out a research project for establishment of the methods of forecasting outbreak of rice diseases and insect pests, and for horticultural crops. The project will be called as Japan-India Joint Research Project (hereinafter referred to as "the Project") and will consist of two sub-projects. One is the sub-project for research on establishment of methods of forecasting outbreak of rice diseases and insect pests, the other is the sub-project for research on horticulture.

The contents of the Project will be the following:

- (a) Research work on the themes as listed in Annexure I;
- (b) Exchange of information, samples, materials and research reports;
- (c) Exchange of researchers and other personnel;
and
- (d) Other activities to be agreed upon between the authorities concerned of the two countries.

(2) Operational Work Plans of the Project will be formulated by the Joint Committees referred to in item 11.

2. (1) In accordance with the laws and regulations in force in Japan, the Japanese authorities concerned will take necessary measures to provide at their own expense the services of Japanese experts as listed in Annexure II.

(2) In accordance with laws and regulations in force in Japan, some additional experts on short term assignment may be dispatched through the normal procedures of the Government of Japan when necessity arises.

3. The Japanese experts referred to in item 2. above and their families will be granted privileges, exemptions and benefits as admissible to experts assigned to India under the Colombo Plan Technical Cooperation Scheme and also will be granted privileges, exemptions and benefits no less favourable than those granted in India to the experts of third countries or the experts of international organizations such as the United Nations serving under similar circumstances.

4. The Indian authorities concerned undertake to bear claims, if any arises, against the Japanese experts engaged in the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in India covered by the present Record of Discussions, except for those claims arising from willful conducts or gross negligence of the Japanese experts.

5. In accordance with laws and regulations in force in Japan, the Japanese authorities concerned will take necessary measures to provide at their own expense such equipment, machinery, vehicles, instruments, tools, spare parts and other materials as listed in Annexure III.

6. In accordance with laws and regulations in force in Japan, the Japanese authorities concerned will take necessary measures to receive Indian researchers and research administrators engaged in the Project for training and study tours in Japan as well as for symposia or other similar meetings to be held in Japan, through the normal procedures of the Government of Japan required therefor.

7. The articles referred to in Annexure III will become the property of the Government of India upon being delivered c.i.f. at the port of disembarkation to the Indian authorities concerned. The articles referred to above will be utilized exclusively for the implementation of the Project.

8. The Indian authorities concerned will take necessary measures to provide at their own expense:

(1) The services of Indian researchers and other personnel including administrative personnel as listed in Annexure IV;

(2) Land and buildings as well as incidental facilities as listed in Annexure V;

(3) Suitable furnished housing accommodations for the Japanese experts and their families;

(4) Transportation facilities for the Japanese expert's official travels within India;

(5) Supply or replacement of equipment, machinery, vehicles, instruments, tools, spare parts and other materials necessary for the implementation of the Project other than those provided by the Japanese authorities concerned under item 5.

9. The Indian authorities concerned will take necessary measures to meet:

(1) All running expenses necessary for the implementation of the Project;

(2) Customs duties and any other charges imposed in India in respect of the articles as listed in Annexure III;

(3) Expenses necessary for the transportation within India for the articles as listed in Annexure III as well as for their installation, operation and maintenance thereof.

10. The Indian authorities concerned will be responsible for the administration and implementation of the Project, and the Japanese experts will provide necessary technical guidance and advice for the Project.

11. For planning the precise programme of work evolving priorities and for ensuring successful implementation of the Project, two Joint Project Committees will be established as specified in Annexure VI. The Committee may appoint sub-committee to deal with specific problem, if necessary.

12. For the successful implementation of the Project, close relationship will be maintained between the Indian agricultural research institutions and Japanese agricultural research institutions.

13. The authorities concerned of the two countries will consult with each other from time to time concerning the successful implementation of the Project.

14. The Project will be implemented for a period of five years.

Annexure I

Research Project and places

1. The Sub-project on forecasting outbreak of rice diseases and insect pests.

research themes	place
A. Research on stem borer	---
(1) Fundamental Research; Physiological study of hibernating generation and ecology of development.	I.A.R.I.
(2) Applied Research; Study on population dynamics during crop season, relating to climatic factors such as rainfall, temperature and humidity to population change.	A.I.C.R.I.P., C.R.R.I. and I.A.R.I.
B. Research on leafhopper tungro	--
Fundamental Research;	
(1) Detection and characterization of virus, purification, serology and electron microscopy, and strain variation in the RTV.	I.A.R.I.
(2) Strain variation and host specialisation in RTV.	A.I.C.R.I.P.
Applied Research; Study on migratory behaviour, life cycles and factors governing populations of the insect, dynamics, ecotypes and mode of hibernation.	A.I.C.R.I.P., C.R.R.I. and I.A.R.I.
C. Research on bacterial leaf blight	
Fundamental Research;	
(1) Bacteriophage technique as a tool for detecting bacterial population.	A.I.C.R.I.P.
(2) Variability in the pathogen including physiology, serology and electron microscopy in relation to physiologic specialization of the bacterium	I.A.R.I.

research themes	place
Applied Research;	
(1) Testing of resistant varieties	C.R.R.I., A.I.C.R.I.P. and I.A.R.I.
(2) Role of infected seeds in the outbreak of the disease	I.A.R.I.
(3) Role of weed hosts in the outbreak of the disease	I.A.R.I., C.R.R.I. and A.I.C.R.I.P.
(4) Factors influencing blight and wilt phases of the disease	I.A.R.I. and A.I.C.R.I.P.
(5) Multiplication of bacteria in the rhizosphere of other crops	I.A.R.I.
D. Research on gall midge	
Fundamental Research;	
(1) Study on biotypes and their genetic differences under controlled growth chamber condition.	A.I.C.R.I.P.
(2) Study on mechanisms of host resistance with emphasis on plant and insect physiology interaction.	A.I.C.R.I.P.
Applied Research;	
(1) Study on population dynamics during rice crop season relating to climatic factors such as rainfall, temperature and humidity to population change.	A.I.C.R.I.P.
(2) Study on off-season biology to determine mode and locations of survival and role of alternative hosts.	

Note: The research work will be carried out in order to establish practical techniques in the field of forecasting outbreak of rice diseases and insect pests at national level.

2. The Sub-project of research on horticulture

research themes	place
<p>A. Research on hybrid seeds production method of vegetables (Tomato, onion, radish, water-melon).</p> <p>Fundamental Research;</p> <p>(1) Study on fundamental techniques to produce hybrid seeds such as varnalization and chemical emasculation.</p> <p>(2) Study on techniques of finding out utilization and maintenance of male-sterile, self-incompatible gynoeocious or poliploidy</p> <p>Applied Research;</p> <p>(1) Study on selection of suitable and economical materials adaptive to local ecological conditions</p> <p>(2) Study on interaction between breeding lines and some ecological factors and cultivation techniques</p>	<p>Indian Institute of Horticultural Research, Hessarghatta (Bangalore)</p>
<p>B. Research on cultivation method of citurs</p> <p>(1) Study on interaction between ecological circumstances and growth</p> <p>(2) Study on citurs propagation method</p>	<p>Indian Institute of Horticultural Research, Hessarghatta (Bangalore)</p>
<p>C. Research on cultivation method of deciduous fruit trees</p> <p>(1) Study on interaction between ecological circumstances and growth</p> <p>(2) Study on crop management of orchard</p>	<p>Research-cum-Demonstration Centre (Simla)</p>

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- Note: (1) The extension and demonstration works resulted from the research works above will be conducted by Indian side.
- (2) The programme of work will be as outlined in Annexure II of the Minutes of Discussions held on November 24, 1972.

Annexure II

List of Japanese experts

1. The Sub-project of research on forecasting outbreak of rice disease and insect pests

	Number
(1) Leader	1
(2) Plant Pathologist (BLB)	1
(3) Plant Pathologist (RTV)	1
(4) Entomologist (Borer)	1
(5) Entomologist (Gall midge)	1
(6) Entomologist (Leaf hopper)	1
(7) Virologist	1
Total	<hr/> 7

Short term experts will be sent as mutually agreed

2. The Sub-project of research on horticulture

	Number	Headquarters
(1) Vegetable breeder	1	Bangalore
(2) Pomologist (<u>citrus</u>)	1	"
(3) Pomologist (deciduous fruit tree)	2	Simla
Total	<hr/> 4	

Note: (1) In the Sub-project of research on horticulture, two team leaders will be individually nominated by the Japanese authorities concerned from the experts who will be stationed in the Institute of Horticulture Research in Bangalore and at the Research-cum-Demonstration Centre in Simla, and one of them will serve concurrently the Sub-project leader of horticulture mentioned above.

(2) The field of experts may be changeable with the progress of the Project implementation after discussion of the authorities concerned of the two countries.

Annexure III

List of equipment, machinery, vehicles, instruments,
tools, spare parts and other materials

- (1) Equipment including electrical articles, instruments, tools, spare parts and other materials for laboratory work
- (2) Equipment, machinery, instruments, tools, spare parts and other materials for field work
- (3) Germ plasma and other material for research work
- (4) Specialized mobile units
- (5) Fertilizer, pesticide and materials for chemical control
- (6) Audio-visual aids and articles for office and training centre work
- (7) Books and other necessary printed matters

Note: (1) The authorities concerned of the two countries will jointly formulate the specific list of the articles on the basis and on the recommendation of the Joint Committees.

(2) The Indian authorities concerned will accordingly arrange for expeditious clearance of the articles.

Annexure IV

List of Indian technical staff,
administrative and other personnel

1. The Sub-project of research on forecasting outbreak of rice diseases and insect pests.

Senior Entomologist (Borer)	1
Junior Entomologist	1
Senior Entomologist (Gall midge)	1
Junior Entomologist	3
Senior Virologist (Fundamental work)	1
Junior Entomologist	1
Senior Virologist (Applied work)	1
Junior Entomologist	1
Senior Virus Entomologist	1
Junior Virus Entomologist (RTV)	1
Senior Plant Bacteriologist	2 One at each of the two centres
Junior Bacteriologist	2

Location to be decided by Joint Committee

Administrative and supporting staff as considered necessary, will be provided.

2. The Sub-project of research on horticulture

(1) Category of counterparts researchers:

Senior Breeder (Vegetables)	1
Senior Horticulturist (Deciduous fruits)	2
Senior Horticulturist (Citrus)	1
Junior Breeder (Tomato, onion, radish, water melon)	4
Senior Research Assistant (Vegetables)	4
" (Deciduous fruits)	2
" (Citrus)	1

(2) Category of personnel:

Superintendent	Bangalore 1	Simla 1	2
Messenger			
Typist	Bangalore 1	Simla 1	2
Driver	Bangalore 2	Simla 2	4
Labourer (vegetable 20, deciduous fruit 6, citrus 3)			29

Annexure V

List of land, buildings and other facilities

1. The Project of research on forecasting outbreak of rice diseases and insect pests

A. At IARI in New Delhi

- (1) Office
- (2) Laboratory 30m² × 2, 50m² × 1
- (3) Glass house 200m² × 1
- (4) Experimental field 30 acre

B. At AICRIP in Hyderabad

- (1) Office
- (2) Laboratory 30m² × 3
- (3) Glass house 100m² × 1

C. Experimental field for research

2. The Project of research on horticulture

D. Institute of Horticulture Research in Bangalore

- (1) Office 40m² × 1
- (2) Laboratory 50m² × 2, 100 m² × 1
- (3) Work room for field research 100m² × 1
- (4) Glass house and Green house 200m² × 1 1,000 m² × 1
- (5) Experimental field 3 ha (vegetable)
1.5 ha (citrus)

E. Research-cum-Demonstration Center in Simla

- (1) Office 50 m² × 1
- (2) Laboratory
- (3) Glass house and Green house 100 m² × 1
- (4) Experimental field 4 ha

Annexure VI

Composition of the Joint Committee

1. Joint Committee of the Project of research on forecasting outbreak of rice diseases and insect pests.

Indian side	Japanese side
(1) Deputy Director General (C.S.)	(1) Japanese Sub-project leader
(2) Project Coordinator, rice	(2) Representative of Japanese experts
(3) Head of Division of Entomology/ Plant Pathology Indian Agricultural Research Institute	(3) Chief adviser of Indo-Japanese Agricultural Extension Centres
(4) Assistant Director General (P.P.)	(4) Representative of the Overseas Technical Cooperation Agency, JAPAN
(5) A representative of Department of Agriculture	
(6) Director CRRI, Cuttack	

2. Joint Committee of the Project of research on horticulture

Indian side	Japanese side
(1) Deputy Director General (C.S.)	(1) Japanese Sub-project leader
(2) Director, Indian Institute of Horticultural Research, Hessarghatta	(2) Representative of Japanese experts
(3) Director, Horticulture, Himachal Pradesh	(3) Chief adviser of Indo-Japanese Agricultural Extension Centres
(4) Representative of Department of Agriculture	(4) Representative of the Overseas Technical Cooperation Agency, JAPAN
(5) Assistant Director General (Horticulture)	

- Note:
- (1) The Director-General, I.C.A.R. will be the Chairman of the Joint Committee.
 - (2) Any other experts from both side may attend the meetings of the Joint Committee of necessity arises with the permission of Chairman.
 - (3) An official of the Embassy of Japan may attend the meetings of the Joint Committee as an observer.

