CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATION

CHAPTER 4 PROJECT EVALUATION AND RECOMMENDATION

4.1 Project Effect

The Indian Government has set an important target on self-sufficiency of food to cope with its increase of population. To play this important role, an increment of food supply through agricultural products is urgently required, and the Governmental policy places emphasis on improving the seed distribution system and on seed research.

The objectives of this Project are to support the DSST of IARI, in relation with seed research and production, through the construction of facilities and the procurement of equipment for improving the investigation of new variety seeds, and for the processing and storage of nucleus and breeder seeds.

However, due to the deterioration of the facilities and equipment for research activities, the insufficient storage capacity and the inadequate seeds storage condition, it is very difficult to maintain the breeder seed quality and quantity required by India in its strategy to attain self-sufficiency of food. Also, under these conditions, an increment of improved seed production cannot be achieved.

By the execution of this project, it is expected that the storage and processing condition for breeder seed will be improved. Consequently, this will contribute to upgrading the living standards of farmers as a result of increased income. Also, it will attain the self-sufficiency which is an important strategy of the Indian Government. Furthermore, it will contribute to strengthening the organization and system of seed research and production.

It is judged that the project's responsible organizations, IARI-DSST New Delhi and IARI Regional Station Karnal, have a sufficient well-trained staff and an adequate budget to operate and maintain the equipment and facilities to be procured under the Grant Aid System. Considering that this project is for the provision of facilities and equipment for research, storage and seed processing, the environmental aspect is quite insignificant.

For humanitarian, social and economic reasons, the implementation of the project under the Grant Aid Cooperation program is quite appropriate. Project implementation will contribute significantly in strengthening Japanese and Indian relationship.

Project benefits and effects are shown in Table 4.1.

Table 4.1 Project Benefit

Present Situation and Problem	Proposed Countermeasure	Project Benefit
(1) Scarcity of land space for agricultural frontier in order to attain the self-sufficiency for increasing population	Strengthening of the production of quality seed and distribution system	Through the improved storage and processing conditions for breeder seed, the conservation of foundation seed for further generations will be attained, and the quality of the certified seed will be maintained. By the extension of quality seed, the food production will be increased and farmers income will be increased.
(2) Insufficient production facility and storage capacity for breeder seed production	Provision of equipment and construction of facility for storage and processing	Concerning the 3 aspects of the production and development of seed; ① Collection and conservation of genetic resources, ② Research and Breeding (Production of breeder seed), ③ Production and distribution, item ② will be strengthened. It will contribute to the increased production of quality seed.
(3) Inability of efficient breeding and research activities	Construction of low temperature storage and provision of research equipment	Through the 20,000 varieties with a storage capacity of 3.3 tons, the quality of research activities and seed development will be improved. Consequently, breeding research for quality seed will be strengthened.
(4) Deterioration of breeder seed quality	Execution of the project	The project will contribute to the introduction of renovated technology for others agencies through the utilization of the high quality processing and storage facility.
(5) Low level of quality seed replacement (at present 5%)	Construction of the facility and provision of equipment	High quality of breeder seed will be certified by the execution of the project. It will contribute to increase the interest and confidence of the farmers for the obtainment of quality seed, and finally to increase the utilization of quality seed.
(6) Insufficient capacity of normal temperature storage	Construction of storage facility and diversion of existing seed processing facility for this purpose	As a result of increased storage capacity, the decrement of seed quality affected by weather and insects will be improved. And, by the separate storage for processed seed and not processed seed, transmission of insect and disease will be decreased.
(7) Insufficient capacity of low temperature storage - Deterioration of seed quality - Transmission of insect and disease - Slowdown of efficiency for the seed treatment	Construction of low temperature storage	To conserve the quality of emergency seed and residual seed, for the efficient use of production seed. Also, it will contribute to the provision of emergency seed during periods of natural disasters.
(8) Decrease of work efficiency of existing seed treatment equipment	Provision of seed processing facility	To increase work efficiency of seed treatment and to improve the seed quality.
(9) Insufficient research equipment	Provision of research equipment	To strengthen research regarding the production of quality seed.

4-2 Recommendation

(1) As a result of Project execution, quality breeder seeds will be developed. For the effective functioning of the extension of created quality breeder seeds, the strengthening of national seed cooperation, agricultural universities and private seed companies is required for the production and distribution of seeds.

(2) For the self-sufficiency of food, the renovation of seed is very important. For this purpose, it is recommended that high quality IARI seed be produced and distributed directly to the farmers. This will contribute to creating a demand and extension for quality seed.

(3) To use the facility and equipment to be procured under this project efficiently, the strengthening of the operation and maintenance system and budgetary aspect are necessary.

(4) By this project, improvement of the research and breeding of seed will be attained. However, close cooperation with the USAID Project (Collection and conservation of plant genetic resources) and the World Bank Project (Production and distribution of seed) will be required.

(5) Considering that the equipment and facility to be procured under this project are quite advanced, their utilization for the technical training regarding the processing and storage method are recommended.

APPENDIX

Appendix 1. Study Team Member List

Assignment	Name	Title
Team Leader	Hideo ONO	Managing Director, Hokuriku Branch Office, JICA
Seed Protection Planner	Masao FUJII	Senior Officer, Sericulture Div. Kinki Regional Agricultural Administration Office, MAFF
Chief Engineer	Satoru KIDO	Pacific Consultants International (PCI)
Facility Engineer	Osamu SUZUKI	ditto
Equipment Engineer	Yoshihiko BAN	ditto

Appendix 2. Survey Schedule

No.	Date	Day	Activities
1	Jan. 22	Sun	Tokyo - New Delhi
2	23	Mon	Courtesy call at Embassy of Japan, JICA, MOF, MOA, ICAR, IARI
3	24	Tue	Submission & explanation of Inception Report at IARI, New Delhi
4	25	Wed	New Delhi - Karnal, Site investigation & discussion at IARI Regional Station, Karnal - New Delhi
5	26	Thu	Collection & analysis of data
6	27	Fri	Discussion on Minutes of Discussion (M/D) with IARI, DARE, ICAR
7	28	Sat	New Delhi - Jaipur, Site investigation of seed production
8	29	Sun	ditto Jaipur - New Delhi
9	30	Mon	Discussion on Minutes of Discussion (M/D) with IARI, DARE, ICAR
10	31	Tue	Signing of M/D at MOF,
11	Feb. 1	Wed	Site survey at DSST
12	2	Thu	ditto
13	3	Fri	New Delhi - Karnal, site survey & discussion at IARI Regional Station, Karnal
14	4	Sat	Site survey at IARI Regional Station, Karnal
15	5	Sun	Karnal - Agra
16	6	Mon	Site survey at NSC, Agra - New Delhi,
17	7	Tue	Technical survey of equipment at NSC, site survey at DSST
18	8	Wed	Technical survey at NBDGR
19	9	Thu	Site survey & discussion at DSST
20	10	Fri	Discussion on equipment & facilities with DSST, report to Embassy of Japan
21	11	Sat	Collection & analysis of data
22	12	Sun	New Delhi - Karnal
23	13	Mon	Site survey & discussion at IARI Regional Station, Karnal
24	14	Tue	ditto
25	15	Wed	ditto Karnal - New Delhi
26	16	Thu	Discussion with DSST
27	17	Fri	Discussion on Technical Notes with DSST
28	18	Sat	Signing of T/N, Courtesy call to IARI, Report to JICA
29	19	Sun	Leave for Tokyo
30	20	Mon	Arrived at Tokyo

Appendix 3. List of Persons Contacted

Department of Economic Affairs, Ministry of Finance

Mr. D. N. Narasimba Raju	Deputy Secretary
Mr. G. S. Grewal	Under Secretary

Ministry of Agriculture

Department of Agricultural Research and Education (DARE)

Dr. R. S. Paroda	Secretary, (DARE)/Director General (ICAR)
Mr. G. S. Sanhi	Joint Secretary DARE and Secretary ICAR
Dr. H. C. Gaur	Under Secretary
Dr. D. K. Reddy	Director DARE

Indian Council of Aguricultural Research (ICAR)

Dr. B.K Tripathi	Assistant Director General (Gommercial Crops)
Dr. Mangala Rai	Assistant Director General (Policy & Perspective Planning)
Dr. P. S. Bhatnagar	Principal Scientist (Seed)
Dr. (Mrs.) P. Kaur	Senior Scientist (Seed)
Dr. P.K. Chowdhury	Project Coordinator (NSP)

Indian Agricultural Research Institute (IARI)

Prof. R. B. Singh	Director
Dr. Panjab Singh	Joint Director (Research)
Dr. S. P. Sharma	Head of Division of Seed Science and Technology (DSST)
Dr. M. M. Verma	Principal Scientist
Dr. K. Kant	Senior Scientist
Dr. Ashok Gaur	Senior Scientist
Dr. (Mrs.) Ishwari Jethani	Senior Scientist
Dr. Surendra Paakash	Senior Scientist
Dr. (Mrs.) Malavika Dadlani	Senior Scientist
Dr. (Mrs.) Anuradha Varier	Scientist

National Bureau of Plant Genetic Resources (NBPGR)

Dr. R. S. Rana	Director
Dr. R. K. Sanxena	Head, Conservation Division & Treasurer
Dr. Ramnath	Head, Plant Quarantine Unit

IARI Regional Station, KARNAL

Dr. K. S. Randhawa	Head, Principal Scientist
DR. S. N. Sinha	Principal Scientist (Entomology)
Dr. Vinod K. Pandita	Scientist Sr. Scale (Hortculture)
Dr. Surender Kumar	Scientist (Plant Breeding)
Dr. S. S. Atwal	Scientist Sr. Scale (Plant Breeding)
Mrs. Nishe Chopra	Scientist Sr. Scale (Agronomy)
Mrs. Anuja Gupta	Scientist Sr. Scale (Plant Pathology)
Dr. Aharam Singh	Senior Scientist (Pathology)
Dr. B. S. Modi	Senior Scientist (Processing & Storage)
Dr. (Mrs.) Shantha Naghrajan	Senior Scientist (Bio-Physics)
Dr. Ramniwas Yadav	Scientist (Plant Breeding)
Dr. B. K. Dutt	Senior Scientist (Farm Power & Machinery)
Mr. Neelam Kumar Chopra	Scientist (Agronomy)

National Seeds Corporation LTD.

Mrs. Deepika Padda	Executive Director & Chief Vigilance Officer
Dr. V. Sankaran	Dy. General Manager (QC)
Mr. S.P. Singh	Deputy Manager, Vegetable Seed Processing & Package Facilities of NSC, AGRA

Japanese Embassy in India

Michio Hirose	First Secretary

JICA India Office

Minoru Sasago	Resident Representative
Masahiro Nomura	Deputy Resident Representative
Nana Hosoi	Assistant Resident Representative

Appendix 4. Minutes of Discussions

MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY ON THE PROJECT FOR DEVELOPMENT OF QUALITY SEED AT THE INDIAN AGRICULTURAL RESEARCH INSTITUTE IN INDIA

In response to a request from the Government of India, the Government of Japan decided to conduct a Basic Design Study on the Project for Development of Quality Seed at the Indian Agricultural Research Institute in India (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA sent to India a study team, headed by Mr.Hideo Ono, Managing Director of Hokuriku Branch Office, JICA, from January 22 to February 19, 1994.

The team held discussions with the officials concerned of the Government of India and conducted field surveys.

In the course of discussions and field surveys, both parties have confirmed the main items described on the attached sheets. The team will proceed to further works and prepare the Basic Design Study report.

New Delhi, January 31, 1995

Mr.Hideo Ono
Team Leader
Basic Design Study Team
JICA

31/1/95

Mr.D.K.Reddy
Director
Department of Agricultural Research and Education,
Ministry of Agriculture

31/1/95

Mr.D.N.Narasimha Raju
Deputy Secretary
Department of Economic Affairs,
Ministry of Finance

S.P. Sharma

Dr.S.P.Sharma
Head
Division of Seed Science and Technology,
Indian Agricultural Research Institute

ATTACHMENT

1. Objective

The objective of the Project is to strengthen research activities on quality seed development and to strengthen quality seed production at the Indian Agricultural Research Institute(IARI), thus contributing to increase of food production.

2. Project sites

i) IARI, New Delhi

ii) IARI, Regional Station, Karnal

(See Map in Annex I)

3. Executing agency

The Department of Agricultural Research and Education in the Ministry of Agriculture is the responsible Department and Ministry. The Indian Council of Agricultural Research (ICAR) in the Ministry of Agriculture is the implementing agency.

4. Items requested by the Government of India

After discussions with the Basic Design Study Team, the items as in ANNEX II were requested by the Indian side:

i) Items for IARI, New Delhi (as in ANNEX II-1)

ii) Items for IARI Regional Station, Karnal (as in ANNEX II-2)

However, the final components of the Project will be decided after further studies in Japan.

5. Japan's Grant Aid system

1)The Government of India has understood the system of Japan's Grant Aid explained by the Team (ANNEX III).

2)The Government of India will take necessary measures

described in Annex V for smooth implementation of the Project, on condition that the Grant Aid by the Government of Japan is extended to the Project.

6. Schedule of the Study

1)The consultants will proceed to further studies in India until February 19, 1995.

2) JICA will prepare the final report in English and send it to the Government of India around May, 1995.

7. Other relevant issues

1) On condition that Japan's Grant Aid is extended to the Project:

a) The Department of Agricultural Research and Education/ ICAR, Ministry of Agriculture will provide necessary personnel for effective operation and maintenance of the equipment and apparatuses procured under the Project.

b) The Department of Agricultural Research and Education/ ICAR, Ministry of Agriculture will conduct necessary refurbishment and renovation of facilities of the laboratories to meet the requirement for the equipment and apparatuses procured under the Project.

c) in connection of a) and b) above, The Department of Agricultural Research and Education/ICAR, Ministry of Agriculture will secure necessary budget to be allocated for the Project.

d) The Indian side will provide and prepare an appropriate site for construction of the seed storage facility and the seed processing and packing facility at Karnal Regional Station.

2) The following criteria will be used for selection of the final components for the Project:

a) economic viability of the Project

b) priority and urgency of the equipment

c) technical competence of staff assigned to the laboratories

d) operation and maintenance cost

e) environmental hazards

3) The Department of Agricultural Research and Education, Indian Council of Agricultural Research and Ministry of Agriculture will make arrangements, such as securing the Expenditure Finance Committee (E.F.C.) clearance at the earliest, which are considered essential to facilitate the prompt implementation of the Project.

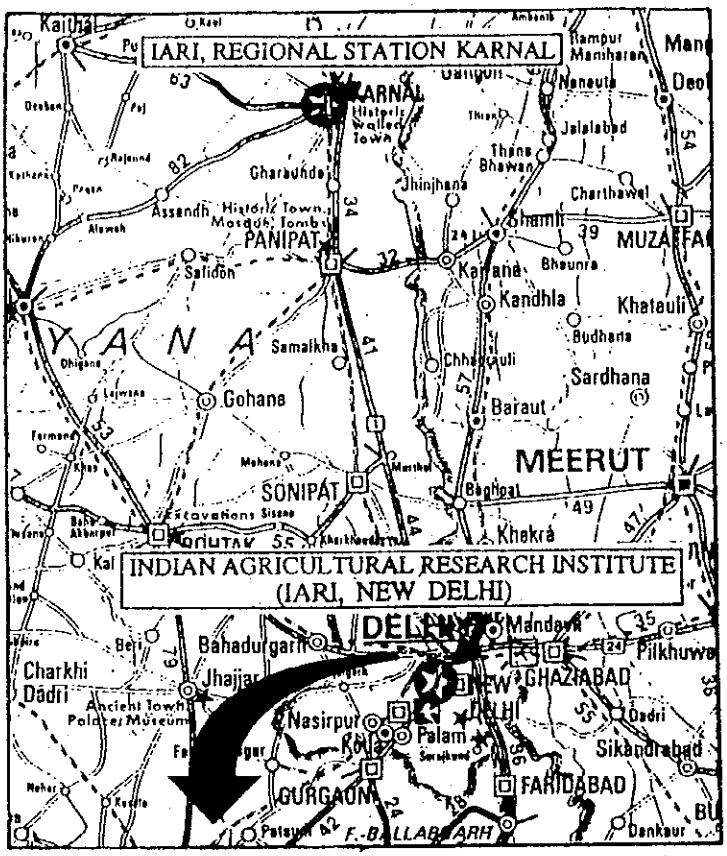
4) The Indian side emphasized that:

a) There is high seed insecurity in South Asia region, therefore these facilities which are being provided by Japan's Grant Aid could help IARI to become a centre of excellence for seed research, need-based buffer stocking of breeder seed, and human resources development.

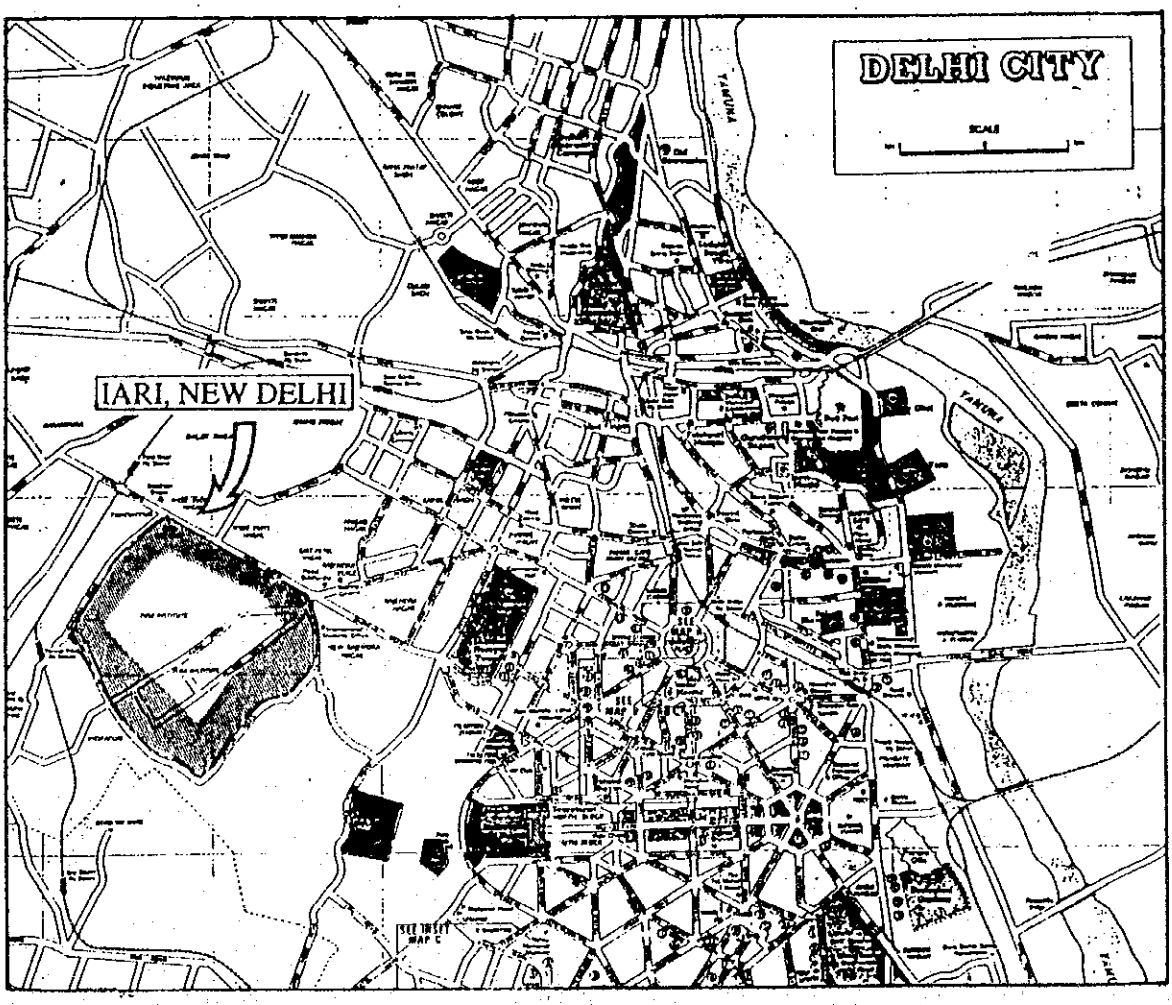
b) In regard to the specification of the equipment to be provided by Japan's Grant Aid, maintenance including spare parts should be noted for smooth running of equipment and facilities.

ANNEX I

LOCATION MAP OF PROJECT SITE



LOCATION MAP OF IARI, NEW DELHI



ANNEX II-1

Items requested by the Indian side for IARI, New Delhi (to be continued)

(1) Procurement of the following equipment and apparatus

Items	Quantity	Priority
1. Seed storage equipment for breeding stocks	1	B
2. Seed storage equipment for authentic samples of varieties	1	B
3. Growth cabinet	1	B
4. Controlled temperature glass house	1	B
5. Seed X-ray unit	1	C
6. Electrophoretic system	1	A
7. Micro centrifuge (refrigerated)	1	A
8. Vacuum seed counter	1	B
9. Photometer	1	A
10. Leaf area meter	1	A
11. Laboratory model of seed processing equipment	1 unit	C
12. Digital moisture meter	2	A
13. Compound research microscope with photoautomat, colour monitor and CCTV camera	1	B
14. ELISA kit	1	B
15. Temperature and humidity meter	2	B
16. Electronic balance	1	A
17. Generator to support seed storage facility	1	B
18. Computer with laser printer	1	A

ANNEX II-2

Items requested by the Indian side for IARI Regional Station, Karnal (continued)

(1) Construction of the following facilities

Item	Quantity	Priority
1. Storage facility for breeder and nucleus seed	1	A
2. Seed processing and packing facility for cereals	1	A

(2) Procurement of the following equipment and apparatus

Item	Quantity	Priority
1. Seed processing and packing equipment for cereals	1 unit	A
2. Seed processing and packing equipment for vegetables	1 unit	A
3. Laboratory model of seed processing equipment	1 unit	A
4. Vacuum fumigation chamber	1	A
5. Temperature and humidity meter	2	A
6. Sample divider	1	A
7. Germination chamber	1	B
8. Moisture meter	2	A

ANNEX III

Japan's Grant Aid Scheme

1. Japan's Grant Aid Procedures

1) The Japan's Grant Aid Program is executed through the following procedures.

-Application; Request made by a recipient country
-Study; Basic Design Study conducted by JICA
-Appraisal & Approval; Appraisal by the Government of Japan and Approval by the Cabinet
-Determination of Implementation; The Notes exchanged between the Governments of Japan and the recipient country

2) Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether it is eligible for Japan's Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firms(s).

Thirdly, the Government of Japan appraises the project to see whether it is suitable for Japan's Grant Aid Program, based on the Basic Design Study report prepared by JICA. The results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes signed by the Governments of Japan and the recipient country.

Finally, for the implementation of the Project, JICA assists the recipient country in such matters as preparing tenders, contract and so on.

2. Basic Design study

1) Contents of the Study

The aim of the study (Basic Design Study) conducted by JICA on

a requested project is to provide a basic document necessary for the appraisal of the project by the Japanese Government.

The contents of the Study are as follows:

a) Confirmation of the background, objectives and benefits of the requested project and also institutional capacity of agencies concerned with the recipient country necessary for the project's implementation.

b) Evaluation of the appropriateness of the project to be implemented under the Grant Aid Scheme from a technical, social and economic point of view.

c) Confirmation of items agreed on by both parties concerning the basic concept of the project.

d) Preparation of the basic design of the project.

e) Estimation of costs of the project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For smooth implementation of the study, JICA uses (a) registered consulting firms(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firms(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firms(s) used for the study is(are) recommended by JICA to the recipient country to also work on the Project

implementation after the Exchange of Notes, in order to maintain technical consistency and also to avoid any undue delay in implementation should the new selection process be repeated.

3. Japan's Grant Aid Scheme

1) What is Grant Aid ?

The Grant Aid Program provides a recipient country with non reimbursable funds to procure facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. Grant Aid is supplied through the donation of materials as such.

2) Exchange of Note (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the project, period of execution, conditions and amount of the Grant, etc., are confirmed.

3)" The period of the Grant Aid" means one fiscal year which the Cabinet approves the project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consulting firm(s) and (a) contractor(s) and final payment to them must be completed.

However in case of delays in delivery, installation or construction due to unforeseen factors such as weather, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

4) Under the Grant Aid, in principle, products and services of Japanese origins or those the recipient country are to be purchased. When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However the prime contractors, namely, consulting, contracting

and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means Japanese physical persons or Japanese juridical persons controlled by Japanese physical persons.)

5) Necessity of the "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is necessary because the source of the Grant is the taxes of Japanese nationals.

6) Undertakings required by the Government of the Recipient Country.

In the implementation of the Grant Aid Project, the recipient country is required to undertake such necessary measures as the following:

a) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.

b) To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.

c) To secure buildings prior to the procurement in case of the installation of equipment.

d) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.

e) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.

f) To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country

and stay therein for the performance of their work.

7) "Proper Use"

The recipient country is required to maintain and use facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

8) "Re-export"

The products purchased under the Grant should not be re-exported from the recipient country.

9) Banking Arrangement (B/A)

a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in an authorized foreign exchange bank of Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant by making payments in Japanese yen to cover the obligation incurred by the Government of the recipient country of its designated authority under the contracts verified.

b) The payments will be made when payment request are presented by the Bank to the Government of Japan under an authorization to pay issued by the Government of the recipient country or its designated authority.

ANNEX IV

Necessary measures to be taken by the Government of India in case Japan's Grant Aid is executed.

1. To secure sites for the Project.

2. To provide facilities for distribution of electricity, water supply,telephone, drainage, sewage and other incidental facilities to the Project site.

   1) Electricity distributing line to the site.

   2) City water distribution main to the site.

   3) Drainage city main to the site.

   4) Telephone trunk line and the main distribution panel of building.

   5) General furniture such as carpets, curtains, tables, chairs and others.

3. To bear commissions to the Japanese foreign exchange bank for the banking services based upon Banking Arrangement.

4. To exempt taxes and to take necessary measures for customs clearance of the materials and equipment brought for the Project at the port of disembarkation.

5. To accord Japanese Nationals whose services may be required in connection with the supply of products and the services under the verified contract such facilities as may be necessary for their entry into India and stay therein for the performance of their work.

6. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in India with respect to the supply of the products and services under the verified contracts.

7. To maintain and use properly and effectively the equipment purchased under the Grant.

8. To bear all the expenses, other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and the installation of the equipment.

Appendix 5. Research Projects

DIVISION OF SEED SCIENCE AND TECHNOLOGY
IARI, NEW DELHI -110012

Research Project 1: Characterization of varieties of wheat, rice, mustard, pearlmillet, soybean, castor and mungbean.

Introduction:

Characterization of crop varieties on the basis of morphological and or biochemical traits is an essential aspect of variety development and seed quality control. Determination of distinct, uniform and stable diagnostic characters of each variety help in genetic purity maintenance of crop varieties.

With the recent changes in Seed Policies in India, it has become essential that the diagnostic characters of cultivars of all important agricultural crops are identified and documented. The present project aims for describing varieties of eight important crops on the basis of physical, biochemical and morphological characters of seed, seedling and mature plant. Identification of other distinguishable varieties in pure seed lot and fixing permissible limits for the same also needs to be worked out. The objectives of the programme are as follows:-

Objectives:

1. To develop key characters for varietal identification based on morphological and biochemical characters at all growth stages.

2. To standardize the techniques for identification and permissible limits of other distinguishable varieties (ODV) in pure seed.

Project Term	:	Five Years (1995-1999)
Budget*	:	Rs. One Million per year
Manpower*	:	Project Leader 1 Project Associates 6

Expected Achievement :

1. To develop/standardise techniques for describing varieties.
2. To develop illustrated mannuals for the use of breeders and for seed certification agencies.
3. To help in establishing the distinctness of varieties.

* *From IARI available budget & scientific staff strength*

Research Project 2. Improvement of storability of seeds of rice, soybean, sunflower, onion, maize and cole crops.

Introduction

High levels of germination and vigour are essential parameters of seed quality to ensure successful crop establishment. Seed vigour and viability, which attain highest levels at the time of maturity, decline gradually during storage. Considerable variability exists in terms of seed longevity at species and cultivar levels. Thus, crops like soybean, sunflower and onion are very poor storers, whereas in maize, rice and other vegetable crops (specially cole crops) marked varietal differences exist with respect to seed storability. The present project aims at developing physical and/or chemical methods to extend seed storability by controlling the rate of physiological and pathological deterioration. Screening of genotypes and assessment of loss in productivity due to decline in vigour would also help in breeding improved varieties and in taking adequate corrective measures to minimise yield loss respectively.

Objectives

1. To study the mechanism of seed deterioration during short medium and long term storage.
2. To identify suitable packaging materials and conditions for prolonging viability during storage.
3. To study the effect of loss in vigour on productivity.
4. To study the genetic & cytological changes occuring during storage.

Project Term : Five years

Budget* : Rs. 0.7 million per year

Manpower* : Project Leader 1
Project Associates 4

Expected Achievements

1. Identification of better storer genotypes and causes for poor longevity so that this information can be used in breeding programme.
2. Identification of suitable storage and packaging conditions and development of effective treatment for prolonging seed storability under different conditions of storage.
3. Verification of revalidation periods and modifications, if required.

** From IARI available budget & Scientific staff strength*

Research Project 3: Seed-borne diseases and their management in rice, wheat, pearlmillet and soybean.

Introduction

Testing for seed-borne diseases has assumed great importance in the National Programme of Seed Certification and Quality Control. The Government of India (GOI) has fixed standards for seed- borne pathogens of important field crops. However, standardized techniques for the assessment of seed health status have not been presented in the National Rules for seed testing. The project is aimed to generate the technical data for standardisation of the procedure, reviewing of standards and suggest control measures. The information generated through this study will be immensely useful for the seed quality control programme.

Objectives

1. Detection and identification of seed-borne fungi, bacteria and viruses and their mode of further spread and to standardise seed-health testing procedures.

2. Development of suitable preventive and control methods for the production of disease-free foundation and certified seeds.

Project Term : Five Years

Budget* : Rs. 0.3 million per year

Manpower* : Project Leader 1
Project Associates 3 (one from Karnal)

Expected Achievements

1. To standardise the tolerance limits (Standards) of seed borne diseases for certification purpose.

2. To standardise the control measures of seed-borne diseases.

** From IARI available budget & Scientific staff strength*

Research Project 4. Post-harvest handling and management of seeds of cereals, pulses, oilseeds and vegetables for efficient packaging, storage, treatment and sowing.

Introduction

Post-harvest technology play an important role in the production of quality seed. In addition to genetic purity, various physical and physiological attributes determine the seed quality.

In the mechanised seed programme, mechanical or chemical injuries to the seeds during harvesting, threshing and processing operations may affect the seed quality. The damaged areas serve as the centre of accelerated ageing due to higher respiration rate and infection with the microorganisms. The unprocessed seed is not fit for sowing or storage because it is contaminated with weeds and other crop seeds and inert material. It is, therefore, essential to dry, clean grade and treat the seeds before packaging, storage, distribution and sowing in order to avoid hazards in agriculture. The project is aimed to develop the post-harvest technology for the production of good quality seed of cereals, pulses, oilseeds and vegetables of prescribed standards and maintain/upgrade the seed quality before storage and marketing.

Objectives

1. Standardisation of aperture shape and size for grading of seeds of cereals, pulses, oilseeds and vegetables.
2. To maximise the recovery of processed seed by suitable screening, grading etc.
3. Study of relative efficacy of different seed treating methods.
4. Standardisation of seed extraction techniques in tomato, brinjal, chillies, watermelon and muskmelon.
5. Determination of critical temperature and exposure time for mechanical drying of rice, sorghum and maize.

Project Term	:	Five Years
Budget*	:	Rs. 1 million per year
Manpower*	:	Project Leader 1 Project Associates 6 (Two from New Delhi)

* *From IARI available budget and scientific staff strength*

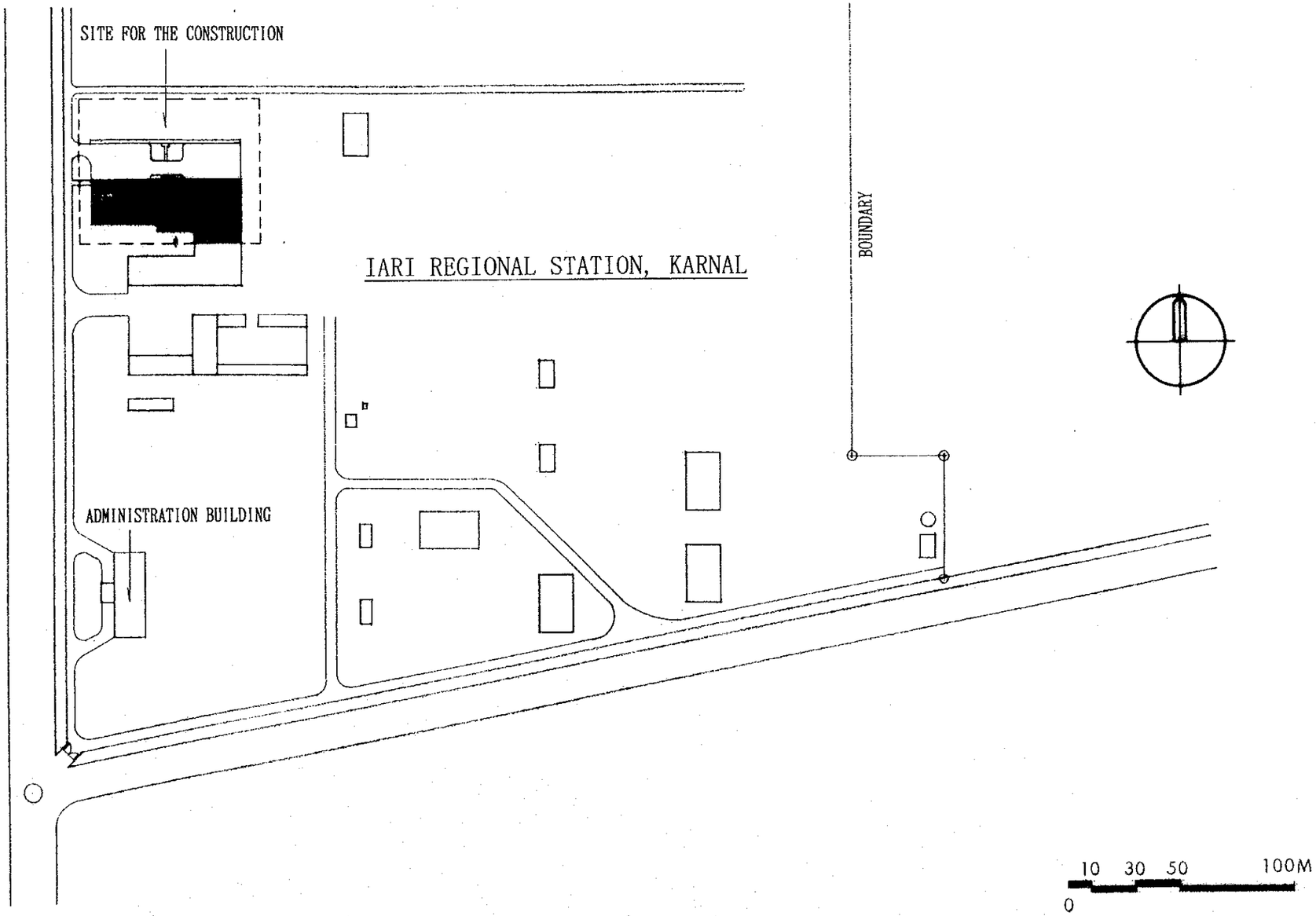
Expected Achievements

1. Prevention/minimisation of seed loss by proper processing.

2. Control of seed-transmitted diseases by effective seed-treatment.

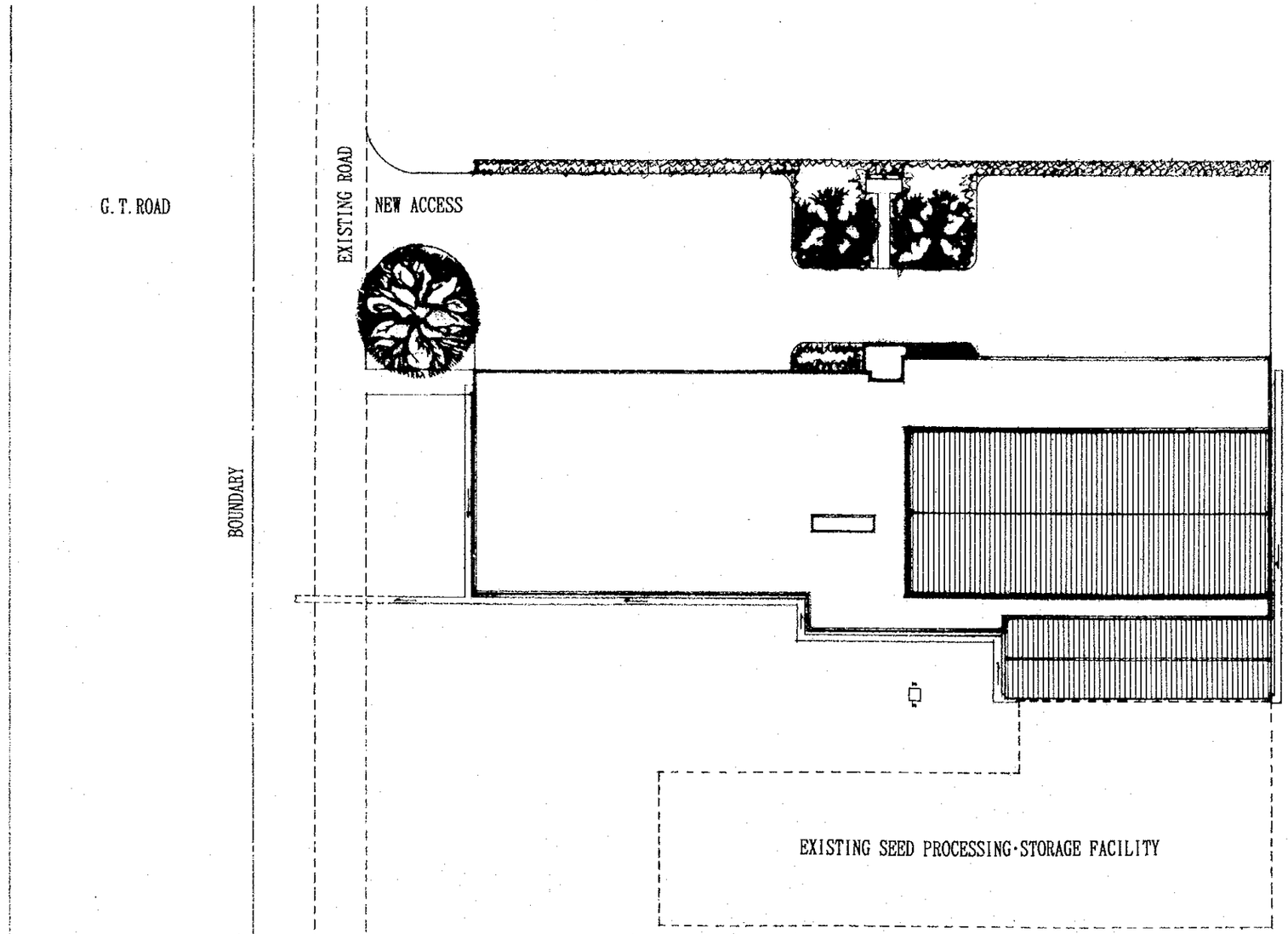
3. Development of economically effective and environment-friendly treatments for control of storage pests and diseases.

APPENDIX 6 DRAWINGS



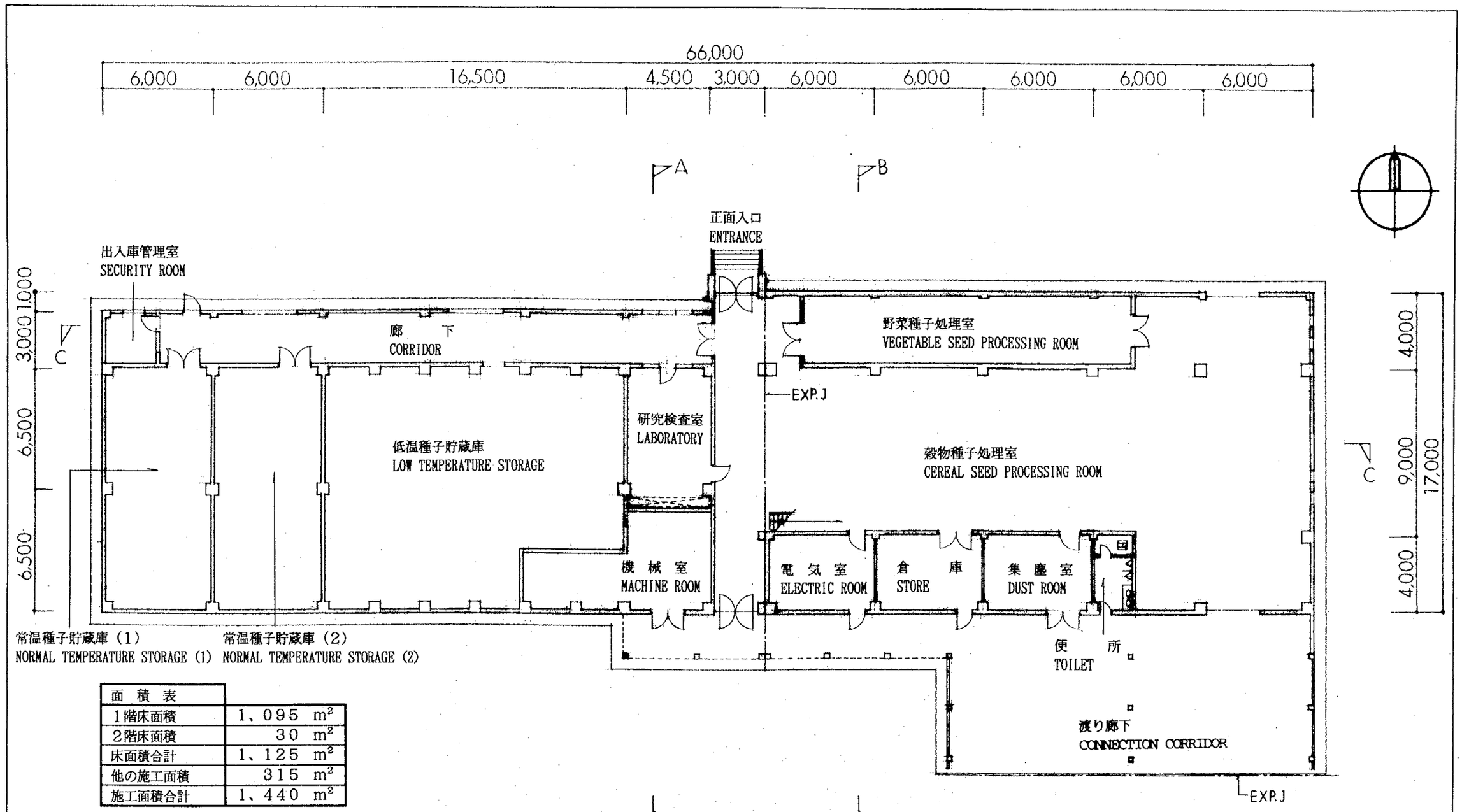
DRAWING No. 1 SITE LOCATION

インド農業研究所優良種子開発計画	THE PROJECT FOR DEVELOPMENT OF QUALITY SEED AT THE INDIAN AGRICULTURAL RESEARCH INSTITUTE



DRAWING No. 2 SITE PLAN

インド農業研究所優良種子開発計画	THE PROJECT FOR DEVELOPMENT OF QUALITY SEED AT THE INDIAN AGRICULTURAL RESEARCH INSTITUTE

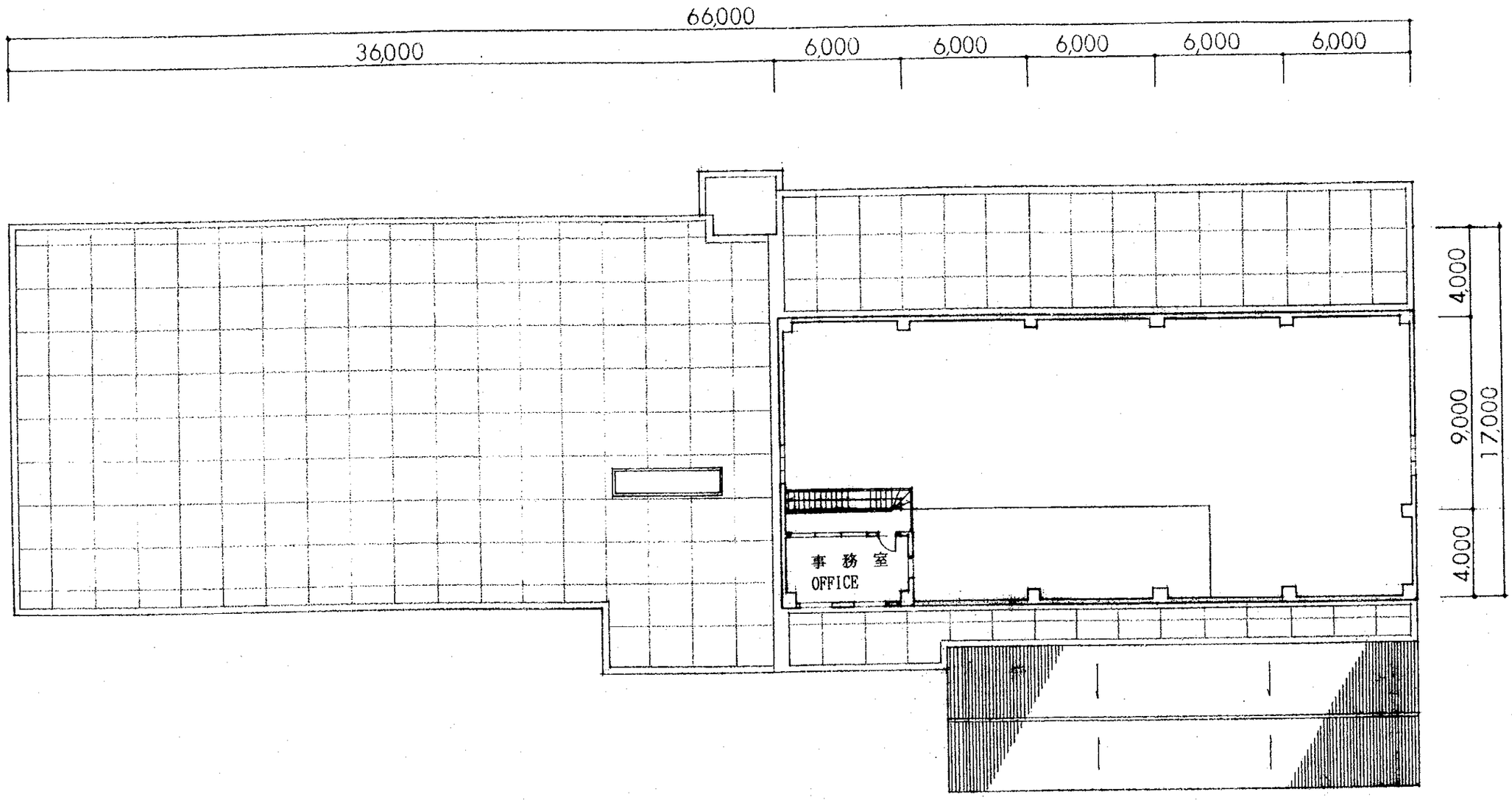


面　積　表	
1階床面積	1、095 m²
2階床面積	30 m²
床面積合計	1、125 m²
他の施工面積	315 m²
施工面積合計	1、440 m²

FLOOR AREA TABLE	
GROUND FLOOR	1、095 m²
FIRST FLOOR	30 m²
TOTAL FLOOR AREA	1、125 m²
OTHER WORK AREA	315 m²
TOTAL WORK AREA	1、440 m²

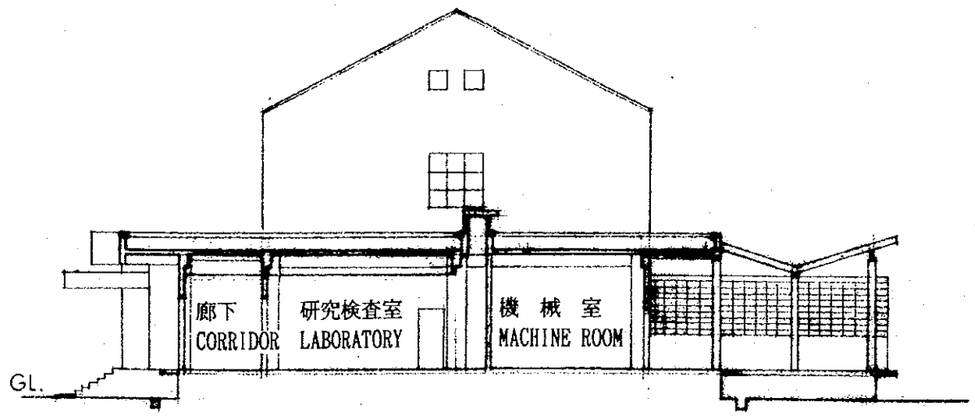
DRAWING No. 3　　GROUND FLOOR PLAN

インド農業研究所優良種子開発計画	THE PROJECT FOR DEVELOPMENT OF QUALITY SEED AT THE INDIAN AGRICULTURAL RESEARCH INSTITUTE

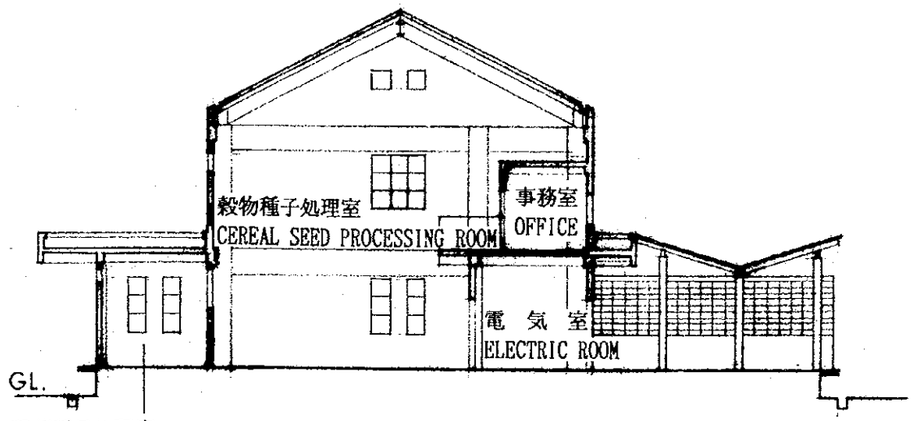


DRAWING No. 4 1st. FLOOR PLAN

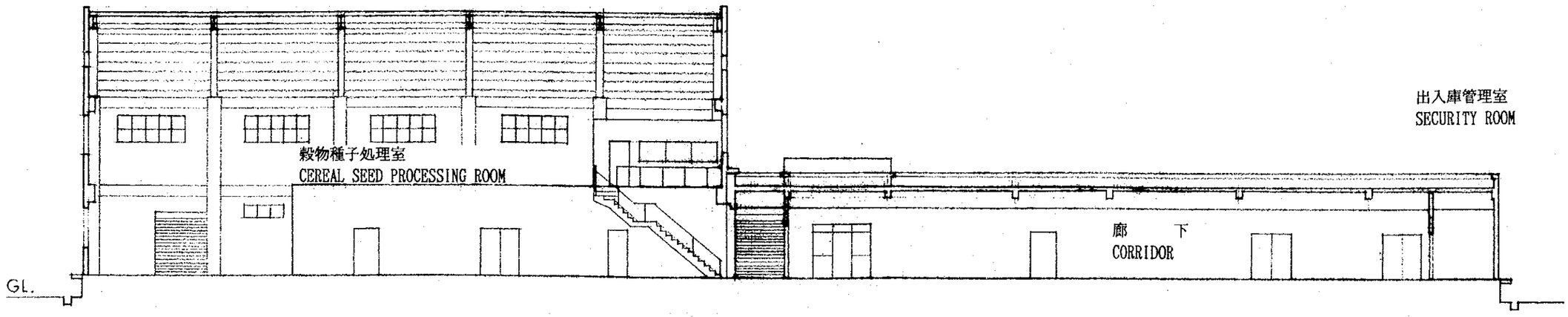
インド農業研究所優良種子開発計画	THE PROJECT FOR DEVELOPMENT OF QUALITY SEED AT THE INDIAN AGRICULTURAL RESEARCH INSTITUTE



A - A SECTION



B - B SECTION

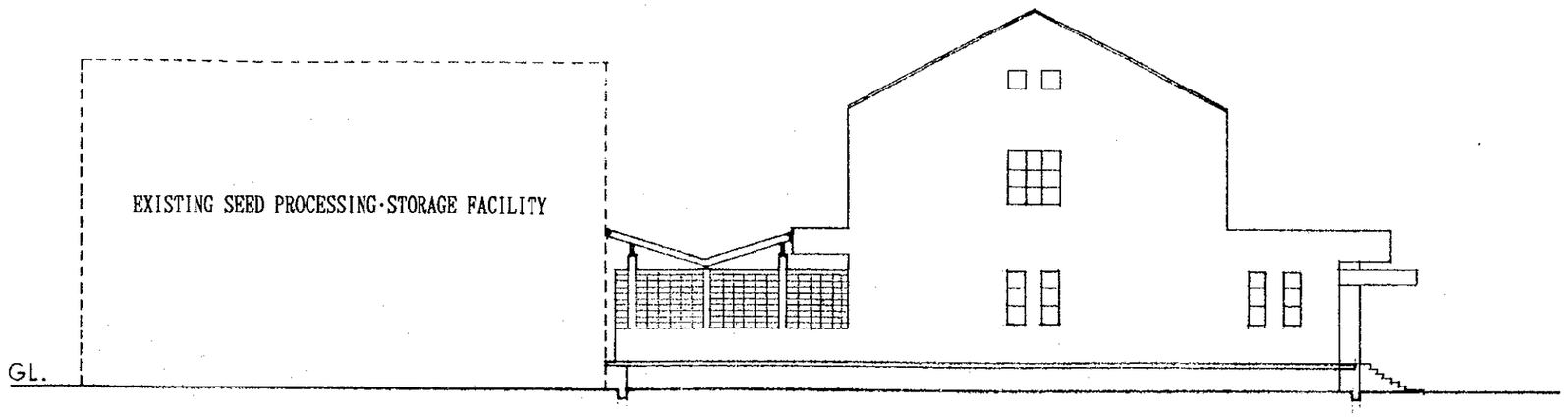


C - C SECTION

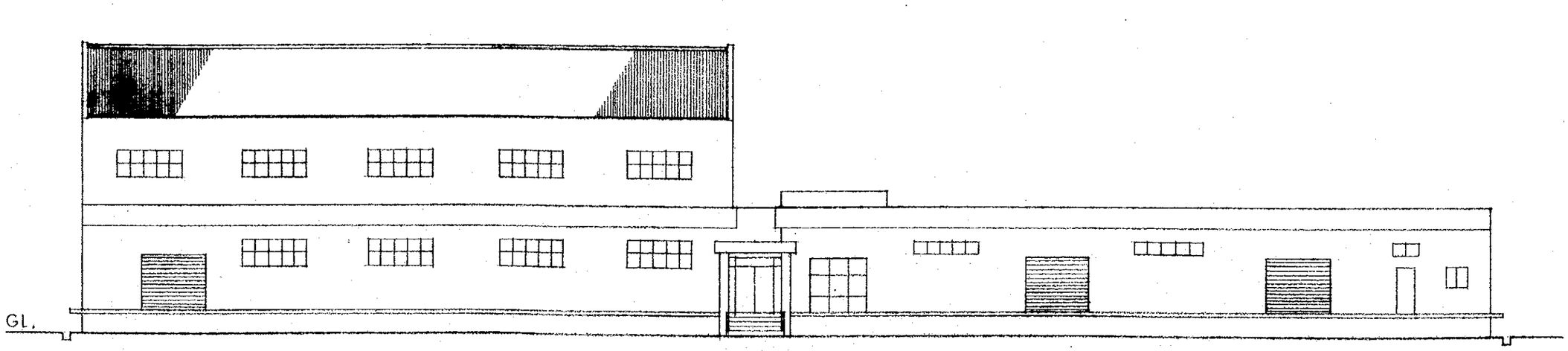
DRAWING No. 5 SECTION

1 3 5 10 M
0

インド農業研究所優良種子開発計画	THE PROJECT FOR DEVELOPMENT OF QUALITY SEED AT THE INDIAN AGRICULTURAL RESEARCH INSTITUTE



EAST ELEVATION

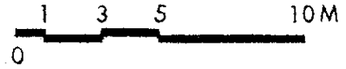


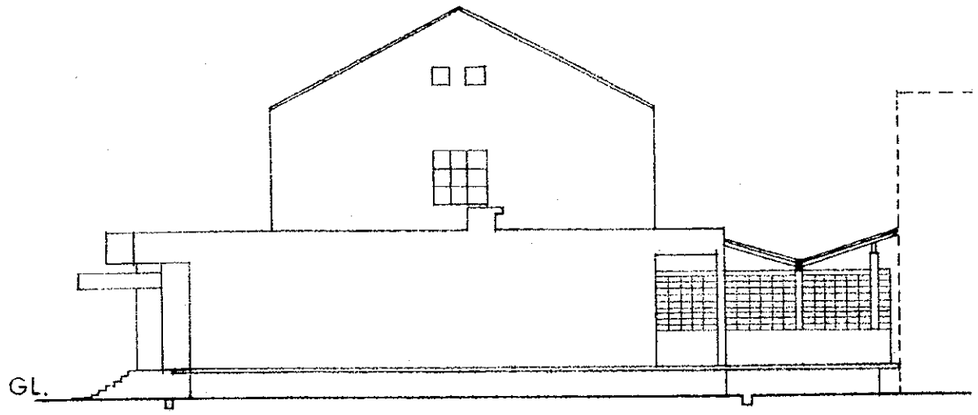
NORTH ELEVATION

DRAWING No. 6 ELEVATION (1)

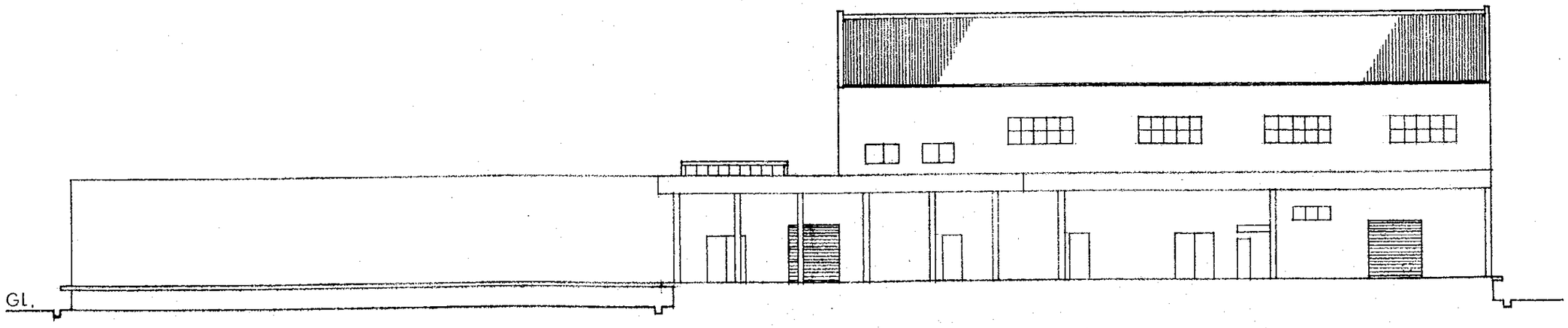
0 1 3 5 10M

インド農業研究所優良種子開発計画	THE PROJECT FOR DEVELOPMENT OF QUALITY SEED AT THE INDIAN AGRICULTURAL RESEARCH INSTITUTE





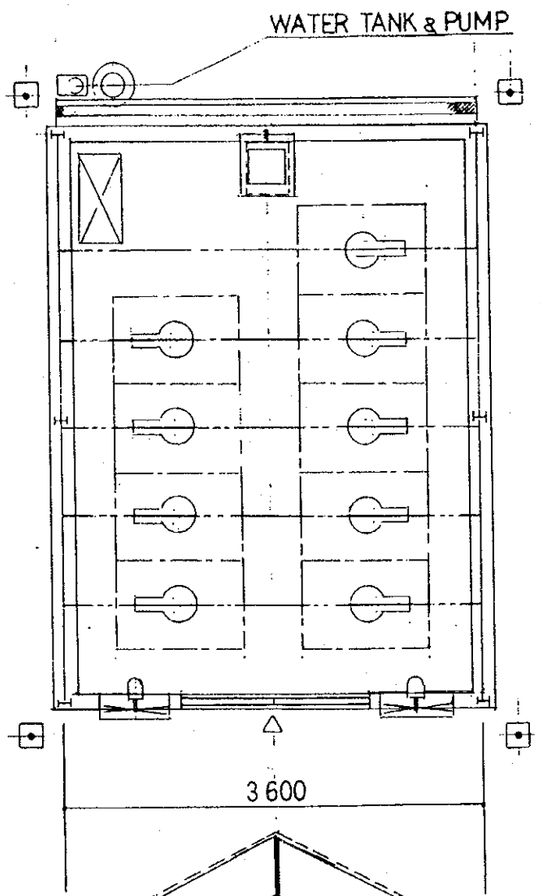
WEST ELEVATION

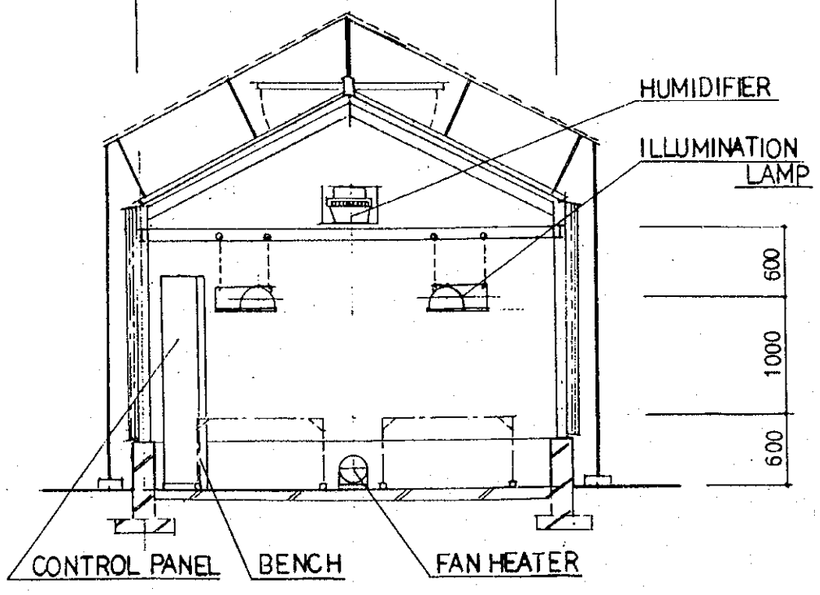


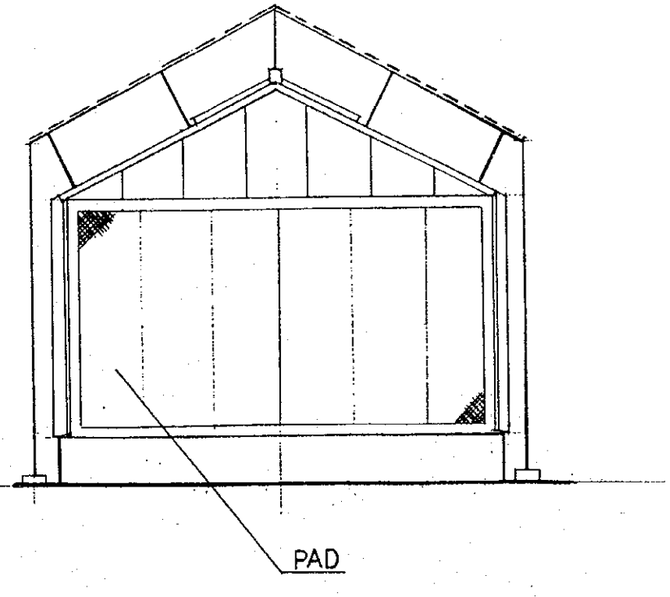
SOUTH ELEVATION

DRAWING No. 7 ELEVATION (2)

インド農業研究所優良種子開発計画	THE PROJECT FOR DEVELOPMENT OF QUALITY SEED AT THE INDIAN AGRICULTURAL RESEARCH INSTITUTE







S= 1 : 100

DRAWING No. 8 TEMPERATURE CONTROLLED GLASS HOUSE