

SUMMARY REPORT ON THE TECHNICAL COOPERATION PROJECT
FOR THE SERICULTURAL DEVELOPMENT IN THAILAND

PREPARED BY

THE JAPANESE EVALUATION SURVEY MISSION

JANUARY 1975

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PREFACE

For the past six years since the Record of Discussions (RD) between Japan and Thailand regarding the joint project on the sericultural development in Thailand was signed in March 1969, cooperation activities on the sericultural development have been implemented under the guidance of the Japanese Experts at the Sericultural Research and Training Centre in Korat, four Sub-centres and Sericultural Pilot Villages in the local areas.

We have been fortunate to be able to generate strong enthusiasm among the officials concerned of the Thai Government as well as the Japanese experts, and to receive a well-organized support from the nucleus of the Sericultural Improvement Division and the National Sericultural Experiment Station of the Ministry of Agriculture and Forestry. In consequence, the results of the cooperation project have received a high degree of evaluation among the parties concerned. Further, the Thai Government, in recognition of the results so far achieved, have renewed their request for the extension of the term of this cooperation project which was to expire in March 1975.

In view of this situation, an evaluation survey team headed by Dr. Kazuo Hazama, Director of Research Planning Division, National Sericultural Experiment Station, was dispatched to Thailand in order to assess the results of the cooperation project on the site, as well as to discuss the extension term and the contents of extended cooperation project in case it should be considered necessary. During the 15-day inspection starting on November 11, 1974, this survey mission conducted discussions with the Thai Government officials concerned and the Japanese experts resident in Thailand, as well as a field survey at the Sericultural Research and Training Centre, the Subcentres and Sericultural Pilot Villages where actual cooperation project had been under way. The following report is a summary of the valuable results of this survey.

We believe that this report is full of viable suggestions, and that it will provide a great deal of information to all parties concerned.

Finally, we should extend our appreciation to the leader and all the other members of the survey mission for their tremendous achievement and to

all the Thai Government officials concerned, the Japanese Embassy in Thailand and to the Japanese experts stationed in Thailand for their thoughtful cooperation in providing us with every convenience possible in conducting this survey.

January 1975

Japan International Cooperation Agency

FORWARD

Ten years ago, I had an opportunity to stop over at Bangkok Airport on my way home from Sweden where I had spent several years studying. Since my plane stopped there only for refueling, my stay in Bangkok then was no more than two hours. However, I can never forget the refreshing impression of the Asiatic scenery around the airport that greeted my eyes which had been so used to seeing the scenes of European urban life.

After ten years since that experience, I was given the opportunity to visit Thailand again. It was surprising for me to see the complete improvement of the airport facilities and the area around it, high-rise buildings in the city and a flood of automobiles which was no different from one seen in Tokyo.

All these changes are the direct indications of the economical development achieved in Thailand in the past ten years. However, once you step into a farm area, it presents different aspects of Thailand which cannot be observed in the city of Bangkok. Since my stay in Thailand was short, and the areas I inspected was rather limited, it is not possible for me to discuss everything about the country here. From what I have seen, however, there was no air of "poverty" in the life of the Thai farmers, although they led a simple and modest life. Their farming life, however, is in keeping with their natural environment, while taking advantage of the climate of high temperature and a large amount of rainfall. As I was looking at the scenery unfolded before my eyes, I felt that the Thai farmers still retained something which had long been lost in Japanese farming life. It seems, however, that a wave of "modernization" will affect the future of the Thai farmers without a question of whether they like it or not. The question here seems to be the specific contents of the country's "modernization". Japan's prosperity today was built on the philosophy of "modernization by means of westernization". However, we have now reached to a point where the course which Japan has taken in the past years is given reconsiderations in various segments of the society. In view of this fact, it seems essential that "modernization" of Thailand be achieved by the hands of the people themselves.

Although technical development is one of the requisites for the "modernization", it has to be achieved in accordance with the natural features of the country concerned. Especially since agriculture and natural environment are inseparable, development of agricultural techniques needs to be carried out in such a manner that it is most relevant to the natural features of the country. Fortunately, sericulture was suited to the climate of Asia, so that its techniques saw a tremendous development with Japan as a leader. In Thailand, which falls into the same climate zone, the importance of sericulture is not different from that in Japan. Japanese guidance in sericultural techniques in Thailand was started on a full scale in 1969 when a Japanese project team was dispatched to Thailand. Since then, the joint efforts made by the two countries achieved the foundation of the Sericultural Research and Training Centre in Korat and the consolidation of four Sub-centres, where research and training activities are conducted to establish the kind of sericultural techniques which are most suitable to Thailand. It has also been our pleasure to see the sound development of our joint project. The term of cooperation is scheduled to end in March 1975. However, since the Thai Government has strongly requested for an extension of the cooperation term, and since it was considered necessary to evaluate the results of the cooperation in the past, a decision was made to dispatch this survey mission to Thailand. Although the survey period was limited to 15 days, the initially intended objectives were achieved with a total cooperation from the dispatched Japanese experts and the officials concerned of the Government of Thailand.

Finally, I would like to express my sincere gratitude to everybody who have generously given their kind cooperation to us in conducting this survey.

January 1975

Dr. Kazuo Hazama
Leader of the Survey Mission

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CHAPTER 1 MEMBERS OF THE SURVEY MISSION AND ITENERARY

1. Members of the Survey Mission

<u>Assignment</u>	<u>Name</u>	<u>Present Position</u>
Leader	Dr. Kazuo HAZAMA	Director of Research Planning Division, National Sericultural Experiment Station, Ministry of Agriculture and Forestry
Sericultural Administra- tion	Mr. Yukio JINBO	Deputy Director of Sericultural Improvement Division, Ministry of Agriculture and Forestry
Cooperation Planning	Mr. Takahito FUSE	International Cooperation Division, Ministry of Agriculture and Forestry
Coordination	Mr. Yoshiaki OHTSUBO	Agricultural and Forestal Planning and Survey Department, Japan International Cooperation Agency

2. Survey Itinerary (November 1 - November 15, 1974)

<u>Date</u>	<u>Schedule</u>
Nov. 1 (Fri.)	<p>JAL 461 Tokyo ——— Bangkok</p> <p>* Discussion at the Bangkok office of JICA on the survey itinerary, policies, etc. (Attended by: Mr. Tsuchiya, Agricultural Attache, Mr. Kuwabara, the Head of the Office, Messrs. Takeda and Morimoto, staff of the Office, Dr. Seinosuke Ohmura, Leader of the Japanese experts, Mr. Chote Suvipakit, Chief of Sericultural Division, Mr. Sombat and the members of the survey mission)</p> <p>(stay in Bangkok)</p>
Nov. 2 (Sat.)	<p>* Discussion on the survey procedures (Attended by: Dr. Ohmura and the members of the survey mission)</p> <p>(stay in Bangkok)</p>
Nov. 3 (Sun.)	<p>Bangkok ——— Ayutthaya ——— Korat</p> <p>* Inspection of Ayutthaya Rice Culture Experimental Station (Accompanied by: Dr. Ohmura and Mr. Sombat)</p> <p>* Meeting with the experts (Attended by: experts with their families and the members of the survey mission)</p> <p>(stay in Korat)</p>

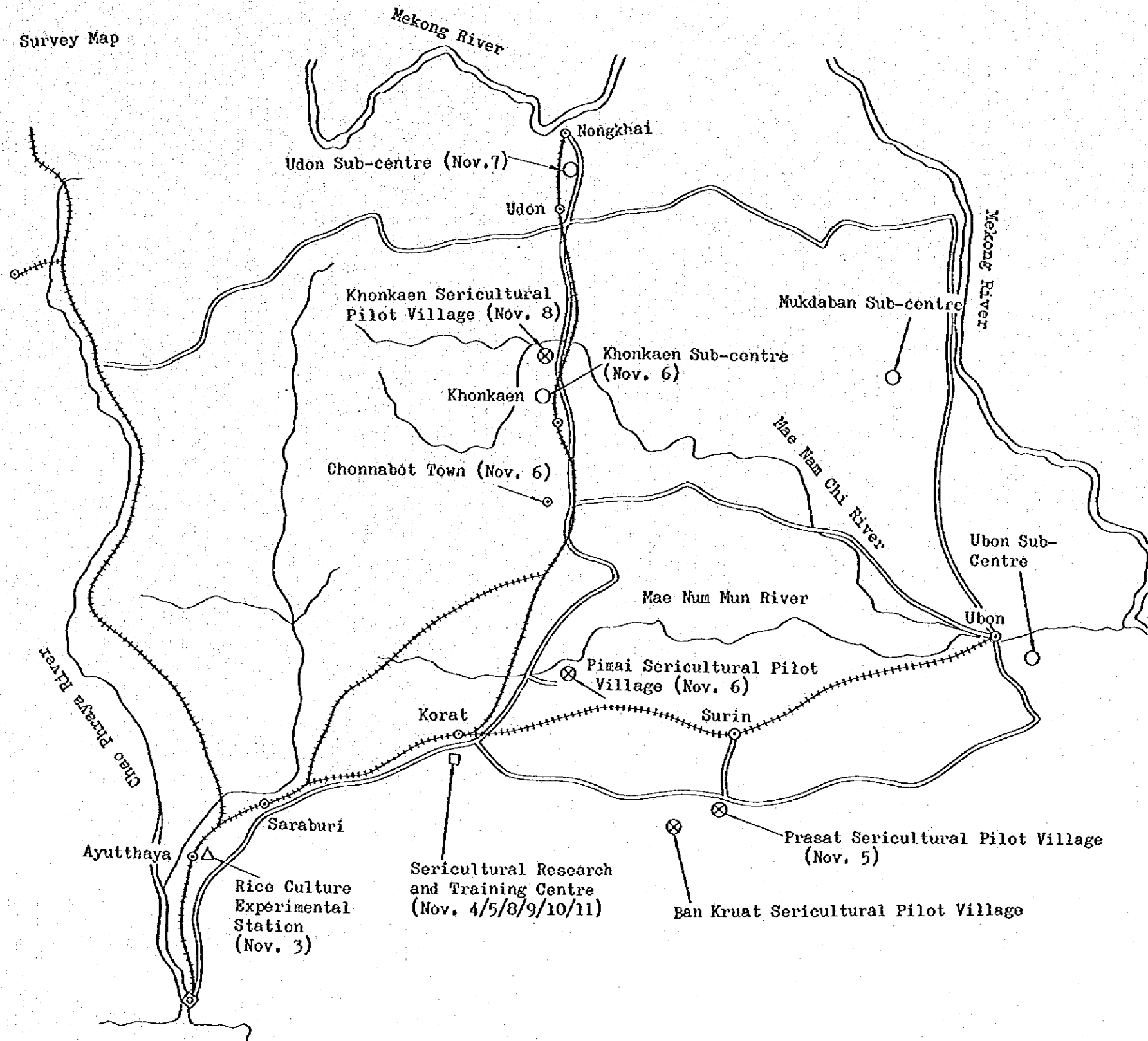
<u>Date</u>	<u>Schedule</u>
Nov. 4 (Mon.)	<ul style="list-style-type: none"> * Inspection tour of the Sericultural Research and Training Centre (Explainers: the members of the expert team) * Discussion on the previous achievement and problems in the research area. (Attended by: the members of the expert team and the members of the survey mission) (stay in Korat)
Nov. 5 (Tue.)	<p data-bbox="520 757 1011 788">Korat ——— Prasat ——— Korat</p> <ul style="list-style-type: none"> * Inspection of the Prasat Settlement Office and sericultural pilot village (Accompanied by: Dr. Ohmura and Mr. Sompoti, Deputy Chief of the Sericultural Research and Training Centre) * Discussion on the previous achievement and problems in the training area (Attended by: Japanese experts and the members of the survey mission) (stay in Korat)
Nov. 6 (Wed)	<p data-bbox="520 1303 1299 1335">Korat ——— Pimai ——— Chonnabot ——— Khonkaen</p> <ul style="list-style-type: none"> * Inspection of the Pimai Settlement Office and sericultural pilot village (Accompanied by: Dr. Ohmura and Mr. Somchard, Chief of the Sericultural Research and Training Centre) * Inspection of a machine-weaving factory in Chonnabot (Accompanied by: Dr. Ohmura and Mr. Somchard) * Inspection tour of sericultural farm households and the cooperative rearing houses of young silk-worms in Chonnabot (Accompanied by: Dr. Ohmura and Mr. Somchard)

<u>Date</u>	<u>Schedule</u>
Nov. 7 (Thu.)	<p>* Inspection of Khonkaen Sub-centre (Accompanied by: Dr. Ohmura and Mr. Somchard) (stay in Khonkaen)</p> <p>Khonkaen → Udon → Nongkhai → Udon</p> <p>* Inspection of Udon Sub-centre (Accompanied by: Dr. Ohmura and Mr. Somchard)</p> <p>* Inspection tour of farm households around Nongkhai (Accompanied by: Dr. Ohmura and Mr. Somchard) (stay in Udon)</p>
Nov. 8 (Fri.)	<p>Udon → Khonkaen → Korat</p> <p>* Inspection of the Khonkaen Settlement Office and the construction site of a mulberry plantation and the cooperative rearing houses of young silkworms (Accompanied by: Dr. Ohmura and Mr. Somchard)</p> <p>* Discussion on extension of sericulture, achievement of training program in the third countries and problems (Attended by: the experts and the members of the survey mission) (stay in Korat)</p>
Nov. 9 (Sat.)	<p>* Discussion on the survey results (Attended by: the members of the survey mission)</p> <p>* Discussion with the experts on the survey results (Attended by: the experts and the members of the survey mission)</p>

<u>Date</u>	<u>Schedule</u>
Nov. 10 (Sun.)	<p>* Meeting with the persons concerned (Attended by: officials of the Prime Ministry, the Department of Technical Economic Cooperation, and the Ministry of Agriculture and Cooperatives, the experts and the members of the survey mission) (stay in Korat)</p>
Nov. 11 (Mon.)	<p>* Inspection of a cocoon competitive show held at the Sericultural Research and Training Centre (stay in Korat)</p> <p>Korat ——— Bangkok</p>
Feb. 12 (Tue.)	<p>* Report and discussion on the survey results at the Embassy and the Bangkok Office of JICA (Attended by: Mr. Tsuchiya, Mr. Takeda, Dr. Ohmura and the members of the survey mission) (stay in Bangkok)</p> <p>* Discussion with the Department of Agricultural Technology on the survey results (Attended by: Dr. Bhakdi Losanandana, Director General of the Department of Agricultural Technology, Mr. Chote Suvipakit, Mr. Tsuchiya, Mr. Takeda, Dr. Ohmura and the members of the survey mission) (stay in Bangkok)</p>
Feb. 13 (Wed.)	<p>* Discussion of survey results and the outcome of the meeting with the Department of Agricultural Technology (Attended by: Dr. Ohmura and the members of the survey mission)</p>

<u>Date</u>	<u>Schedule</u>
Nov. 14 (Thu.)	<p>* Meeting with the persons concerned (Attended by: officials of the Ministry of Agriculture and Cooperatives, the Embassy and the Bangkok Office of JICA, Dr. Ohmura and the members of the survey mission) (stay in Bangkok)</p>
Nov. 15 (Fri.)	<p>* Discussion with the Department of Technical and Economic Cooperation (DTEC) on the survey results (Attended by: Mr. Vanchai, Deputy Director of DTEC, Mr. Takeda, Dr. Ohmura and the members of the survey mission) (stay in Bangkok)</p> <p style="text-align: center;">JAL 452</p> <p>Bangkok → Tokyo</p>

3. Survey Map



CHAPTER 2 PROBLEMS IN THE COOPERATION PROJECT FOR THE SERICULTURAL DEVELOPMENT IN THAILAND

Having analyzed the results of the cooperation project so far achieved in various areas, based on the recent survey results, we feel that the following problems are subject to due considerations.

1. Research Area

(1) Moriculture

- 1) Establishment of the methods of mulberry training and harvesting according to the number of rearings

Methods of training and harvesting mulberry on four times rearing basis have been established. However, an experimental research on the application of mulberry training and the basic forms of harvest methods should be conducted, so as to systematize the cultivation techniques. As a result, technical development will be promoted.

- 2) Establishment of breeding method by means of grafting which uses root-rot resistant mulberry varieties as stocks, and implementation of plantation experiments

The experts have experimented an emergency countermeasure against root-rot, which involved grafting as a possible breeding method of root-rot resistant mulberry varieties for preventing the disease. Since favorable results were obtained from the above experiment, it seems necessary, further, to find a grafting method with better bind. It is also necessary to conduct a plantation experiment in the region already affected by root-rot, so as to better prevent the disease within the cultivation process.

- 3) Implementation of fertilization experiments

Although the techniques for mulberry cultivation based on the application of manure have been established, the method of field maintenance with the fertilization by type of soil has not yet been started. It is essential, therefore, that a fertilization

method be developed in the future for the most prevalent type of soil in cooperation with four Sub-centres.

4) Establishment of techniques of mulberry field maintenance and operation

In developing the sericultural industry in Thailand, it is necessary to establish the maintenance procedures of mulberry fields which suit the climate of the country.

(2) Silkworm Rearing

1) Establishment for the stabilization of silkworm rearing

Increase in the number of rearings can result in the instability of silk production, due to the accumulation of sources of diseases, etc. It is desired, therefore, that silkworm rearing techniques, such as enforcement of disinfection, be developed to establish a more stable silk production.

2) Establishment of standard methods of rearing grown silkworms

While developing superior varieties of silkworms, it will be necessary to establish standards for rearing grown silkworms.

(3) Pathology

1) Promotion of separation of source of root rot and researches on the infection mechanism

Although the route of infection regarding root-rot has already been clarified, it is necessary, further, to separate the source and clarify the development of infection, so that the disease will be eradicated.

2) Selection and multiplication of root-rot resistant mulberry varieties

Along with the study on the source of root-rot, several varieties of root-rot resistant mulberries have already been found. It is advised, further, that researches of selection on the resistant

varieties by area be conducted and that such varieties be multiplied, so that emergency countermeasures will be promoted.

- 3) Establishment of controlling techniques against aspergillus disease

Recently, the above disease was developed around Sericultural Pilot Villages. Since the controlling methods against this disease have been already established, it is necessary to implant the importance of disinfection in the minds of the sericultural farmers, and to reinforce the technical guidance on disinfection.

- 4) Development of research on the ecology of noxious insects on mulberry trees and their controlling methods

Since a higher priority has been given to the technical development of moriculture in the past, research regarding noxious insects, i.e., the kinds of insects which exist, the extent of damage they can cause on mulberry, has been relatively neglected. With the development of new moriculture techniques, it is possible that noxious insects on other crops cause damage to mulberry trees. Therefore, examination of major noxious insects, ecological researches and development of controlling measures against these major insects seem to be essential.

- (4) Improvement of Silkworm Race

- 1) Rearing of superior original strains

For the purpose of producing commercial silkworm eggs with a stable achievement of excellence, it is necessary to promote the improvement of original strains and the production of eggs which have a high quality cocoon.

- 2) Selection of the combinations of F_1 which produce superior F_2

We have promoted the improvement of silkworm race based on a policy of distributing F_2 silkworm eggs to sericultural farmers.

In order to produce F_2 with a stable achievement, however, it will be necessary to select good combinations of F_1 in the future.

(5) Production of Silkworm Eggs

1) Establishment of mass production techniques

With the increased number of Sericultural Pilot Villages and the enlarged scale of rearing, it has become necessary for the production of silkworms to meet the demand which presently exists. It is suggested, therefore, that techniques of silkworm-egg production to suit the climate of Thailand be developed, and that the mass production techniques be established as soon as possible.

2) Establishment of techniques regarding artificial hatching and refrigeration under the high-temperature conditions

We feel that the techniques of silkworm-egg production under the high-temperature conditions, especially the methods of artificial hatching and refrigeration, have been developed to a certain extent. In case where mass production becomes the basic form of producing silkworm eggs, however, it will be necessary to further develop research on these techniques, and to completely systematize the techniques regarding artificial hatching and refrigeration, both of which are important in the silkworm-egg production.

(6) Silk Reeling

1) Establishment of a series of techniques covering from cocoons, raw silk to twisted yarns

As for the silk reeling techniques, a series of techniques from cocoon drying, silk reeling to twisting has been established to a certain extent. However, it will be necessary to complete the development of silk reeling techniques, which include methods of disposing carry-over cocoons under the high-temperature conditions as well as disposing raw silk reels under non-operation

periods, with due emphasis placed on the improvement of quality.

2) Study on the cocoon testing methods

Currently, cocoons produced at the Sericultural Pilot Villages are delivered to the Korat Center, where the production of raw silk is conducted. In case of selling fresh cocoons, they are evaluated according to the established criteria in quality such as cocoon layer ratio. However, it will be also necessary to develop a system for evaluating the cocoon quality during the cocoon handling process, so as to formulate a basis for the development of the sericultural industry in Thailand.

3) Securing of reeling technicians

Keeping the same personnel on the job of reeling and receiving technical training will result in successful achievement in the reeling techniques. It will be also necessary to secure reeling technicians and other manpower needed for the silk reeling facilities installed at the Centre.

2. Training Area

(1) Securing of counterparts and implementation of training and re-training programs

As for the counterparts at the Korat Centre and the Sub-centres, a special consideration should be given to the securing of additional manpower in Thailand to keep up with the new development in the sericultural industry. Further, these training program should not be conducted only once. Rather, it is considered especially important to develop a plan for implementing a re-training program every two or three years.

- (2) Reinforcing the training of Settlement Office personnel and implementing the re-training program

The number of Sericultural Pilot Villages is planned to be increased in the future. Since the establishment of modern sericultural techniques at these villages serves as the important basis for the development of the sericultural industry in Thailand, it is a pressing task to reinforce the training in sericultural techniques of the Settlement Office personnel who are currently responsible for the management and guidance of their settlements. At the same time, educating the Settlement Office staff in the methods of guiding sericultural farmers will be a key for the development of the Sericultural Pilot Villages. It is also considered necessary to strengthen the technical guidance through a periodical re-training program.

- (3) Implementation of farmer training at Sub-centres and Village farm guidance by the staff of the Sub-centers.

When a greater number of Sericultural Pilot Villages are established around the Sub-centres in the future, the Sub-centres will be put in charge of guiding the Villages for the time being. Therefore, it will be necessary for the Sub-centres to take the responsibility of implementing the training of farmers of the Sericultural Pilot Villages in sericultural techniques. Further, it will be difficult to establish new sericultural techniques without the individual technical guidance for farmers of the Pilot Villages.

- (4) Training of the techniques for maintenance of tree

It is suggested that training in moriculture techniques, which is the basis of sericulture, especially the techniques for maintenance of tree, be reinforced as one of the training subjects for the counterparts and other staff related to sericulture.

3. Training and Guidance for Sericultural Pilot Villages

As regards the improvement of the technical level of individual Pilot Village farms through an intensified technical guidance, and the Sericultural Pilot Villages which are the bases for the establishment of new sericulture in Thailand, it is essential for the individual farmers there to master and practise the new sericultural techniques. It is necessary, therefore, to improve the technical standard of each farm through reinforcing the appropriate technical guidance, while stimulating their enthusiasm toward sericulture. This, however, cannot be achieved through one or two guidance sessions. As long as there is sericulture in Thailand, it will be essential to develop a long-term training program. Regarding the training and guidance of these Pilot Villages, therefore, it is desirable to plan a gradual development by means of a thorough study on the details including guidance policies and procedures.

Attachment

1. Technical guidance of the Village farms should be undertaken, for the present, by the staff of the Settlement Offices and the Sub-centres.

It is necessary to clarify the procedures for providing guidance to the Village farms. Based on the results of this survey, we concluded that the technical guidance of farms should be undertaken, for the time being, by the joint efforts of the Settlement Office staff and the Sub-centres staff. It is suggested that the Ministry of Agriculture and Cooperatives of Thailand discuss this point as one of the important matters, and that they put it into practice as soon as possible.

2. Systematization of research and training programs through the Centre as a core

Under the present circumstances, although the functions of the Centre and the Sub-centres are divided to a certain extent, they seem to function in cooperation with each other. However, in order to further

strengthen their cooperation and compensation on an operational basis in the future, there will be a need for a closer coordination and communication between these organizations. Therefore, we feel that it is desirable to promote periodical meetings and joint research activities, and to reinforce their organized activities. (The Centre should retain the leadership over the Sub-centres.)

CHAPTER 3 CONSIDERATIONS (FUTURE DIRECTIONS OF THE COOPERATION PROJECT)

Based on our survey on the site and a series of discussions we had with the experts stationed in Thailand, we, as the Evaluation Survey Mission, have selected the problems which was mentioned in the previous chapter. These problems can be considered the matters which still remain unsolved within the framework of the current cooperation project. As a result, it will be necessary to clarify and solve these questions, if the current technical cooperation project for the sericultural development is to be further pursued. The survey mission considers that the future directions of the cooperation project should be set as follows:

1. For the further development of the sericultural industry in Thailand, it will be necessary to extend the cooperation term for three years starting from March 8, 1975 up to March 7, 1978.
2. During the above-mentioned period, activities listed below should be promoted with due emphasis.
 - 1) Activities within the Sericultural Research and Training Centre at Korat
 - a. Reinforcement of research on moriculture, silkworm rearing, silkworm-eggs production, pathology and improvement of varieties, and development of techniques for the purpose of establishing new sericultural techniques among farmers of the Sericultural Pilot Villages as the cores.
 - b. Research for establishing integrated silk reeling techniques from reeling, rereeling to twisting.
 - c. Training and guidance for the purpose of establishing techniques of mass production of silkworm eggs and reinforcing the silkworm-eggs production techniques within the Sub-centres.
 - d. Reinforcement of training and re-training of the staff of the

Sub-centres, the staff and the personnel related to guidance of the Sericultural Experimental Stations, and farmers of the Pilot Villages.

2) Activities within the Sub-centres

- a. Promotion of production, rearing and distribution of silkworm eggs and mulberry saplings under the guidance of the Centre.
- b. Reinforcement and completion of technical guidance of farmers in and out of the Pilot Villages.

3) Activities within the Pilot Villages

Establishment of Sericultural Pilot Villages equipped with a model cooperative rearing houses of young silkworms as well as a model mulberry field at Ban Kruat, Khonkaen, Udon, Ubon and Mukdahan, in addition to the Sericultural Pilot Villages at Prasat and Pimai where the above facilities have been already installed.

4) Technical consultation for the development of raw silk reeling industry in Thailand

3. Dispatch of the following Japanese experts is considered necessary.

Leader	1 person
Expert on silkworm rearing	1
Expert on silkworm breeding	1
Expert on silkworm eggs production	1
Expert on diseases of silkworm and mulberry	1
Expert on mulberry cultivation	1
Expert on filature	1

(A short-term assignment of an expert will be considered, if necessary.)

In addition to the above, there may be a need to send additional experts on a short-term basis.

4. It will be necessary to supply additional machinery, equipment, vehicles, instruments, tools, spare parts and other materials from JICA to Thailand.
5. It is necessary to continue sending Thai trainees to Japan under the normal procedures of the Colombo Plan.
6. With further development of this project, it will be desirable to induce technicians of the third countries to be trained in the sericultural field in Thailand, if such need should arise.
7. For the successful implementation of the project, it is desirable to continue having the joint committee meetings in the future.

CHAPTER 4. IMPORTANT SUBJECTS TO BE CONSIDERED REGARDING THE TECHNICAL COOPERATION PROJECT FOR THE SERICULTURAL DEVELOPMENT IN THE FUTURE

The Central Sericultural Research and Training Centre was established in Korat as a basis for the development of the sericultural industry in Thailand. With this as a momentum, systematization of new sericultural techniques has been pursued at the Centre under the joint efforts of Japan and Thailand. Training of sericultural technicians has been carried forward as planned. And the establishment of Sericultural Pilot Villages as the bases for the diffusion of techniques has finally been set in the right direction. Likewise, the cooperation project has been gradually developed. If the project is to be further promoted for years to come, it will be necessary, during the extended period, to aggressively reinforce the functions of the Korat Centre and the Sub-centres as the central institutions for the development of the sericultural industry in Thailand. From this standpoint, the survey mission wishes to present the following recommendations regarding the cooperation project in the future.

1. Basic Attitude toward the Cooperation Project

It has been six years since this cooperation project was initiated in 1969. During this period, it has been our pleasure to see the steady results achieved by the close coordination and joint efforts of Japan and Thailand. The present results are based on the accumulation of steady efforts expended on the construction of the Centre, consolidation of the Sub-centres, training of technical staff, research for the establishment of techniques, and the establishment of Sericultural Pilot Villages. As for the cooperation project in the future, it is considered that emphasis will be placed on building a foundation for the development of the sericultural industry in Thailand on the basis of the results which have been achieved so far. It is desirable, therefore, that cooperation from Japan be given in such a way that Thailand will be able to operate the Centre and conduct activities

such as farm guidance by their own efforts in the future. Further, it will be necessary for the Thai Government to expend their efforts to improve the calibre of sericulture related institutions with the Centre as a core, and to aggressively strengthen the guidance system, so that they will be able to establish a foundation for the promotion of sericulture for themselves.

2. Promotion of Activities within the Centre

Establishment of techniques regarding silkworm and mulberry should be pursued. It is especially important to systematize basic techniques for the farmers to implement silkworm rearing. At the same time, it will be necessary to establish techniques of silkworm-eggs production, secure necessary manpower including the counterparts in various fields, implement technical training and re-training, secure technicians and to train/re-train them so as to improve the operation of the Sub-centres. Securing of manpower for the Centre and the Sub-centres is a key for the future development of the sericultural industry in Thailand. Without sufficient technical manpower, promotion of sericulture will be a castle in the air.

- (1) Systematization of techniques concerning mulberry cultivation and silkworm rearing
- (2) Development of controlling methods against mulberry root-rot disease
- (3) Establishment of mass production techniques of silkworm eggs and training in these techniques
- (4) Securing of technical manpower including the counterparts and their re-training
- (5) Thorough guidance on the Sub-centres operations

3. Promotion of the Sub-centre Activities

It is considered necessary to concentrate efforts on promoting the works done within the Sub-centres. In this connection, it will be necessary for the Thai Government to increase the manpower of the Sub-centres and to allot a greater portion of budget for their operation, while promoting the following projects.

- (1) Production, rearing and distribution of silkworm eggs and mulberry saplings under the guidance of the Centre.
- (2) Reinforcement of technical guidance for the Sericultural Pilot Villages and other farms, and training of farmers.

4. Reinforcement of Guidance for the Sericultural Pilot Villages

As for the technical guidance for already established Sericultural Pilot Villages and the farmers within the areas where the Villages are to be established in the future, it is necessary for the Centre and the Sub-centres to take charge. As regards the diffusion of new sericultural techniques among individual farmers, it is necessary for the staff of the Settlement Offices and the Sub-centres to implement a thorough guidance.

As for the Sericultural Pilot Villages which are to be established in the areas around the Sub-centres, it will be necessary to seek guidance and advice of the Japanese experts during the process of planning the establishment of mulberry fields, sericultural industry, etc.

