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Subject : Some suggestion for the increase of the production of raw silk in South Sulawesi
(Reinforcement of Extension Service Division)

Dear sir,

As we all those who are working in the Sericultural Development Project are aware, the production of raw silk in South Sulawesi has not been improving in spite of the successful technical development achieved so far.

Herewith, we would like to make some suggestions that might help the Project in performing activities for the increase of the production of raw silk in the Province.

A. Problems :

The reasons of the stagnating raw silk production can probably be summarized as follows.

- (1). Limited acreage of productive mulberry fields.
- (2). Limited number of sericultural farmers.
- (3). Limited (non-expanding) rearing capacity of farmers.
- (4). Low (non-improving) technical level of farmers, thus poor productivity of raw silk per box of silkworm eggs and per hectare of mulberry field.
- (5). Limited supply of essential materials and tools needed for sericultural activities.
- (6). Unstable and low price of raw silk produced by farmers.
- (7). Limited (non-increasing) and/or unstable silkworm egg supply.
- (8). Insufficient vigorousness of project silkworm varieties for the present conditions of silkworm rearing activities of farmers.

Anyone of above mentioned limiting factors can possibly prevent the increase of raw silk production if existing, though we feel that the raw silk production in South Sulawesi is limited at present level by the combined effects of all those factors.

In details, we can probably explain each limiting factors as follows.

(1). On limited acreage of productive mulberry fields :

As of May, 1983, South Sulawesi has following acreage of mulberry fields.

Productive : 2,238.32 ha

Non-Productive : 2,426.19 ha.

Though we don't clearly know the breakdown of non-productive mulberry fields, 2,238.32 ha of productive mulberry fields have the capacity of rearing roughly 22,383 boxes of silkworm eggs (if 0,3 ha is needed per box per period and same mulberry field can be harvested three times a year).

However, mulberry fields were not utilized so effectively in the past as shown in the following figures, probably due to lengthy drought, poor maintenance conditions, no fertilization, outbreak of mulberry pests & disease, poor rearing plans etc.

Actual consumption of silkworm eggs in South Sulawesi (Project supply + Import).

| | | | | | | | |
|-------|-------------|----------|-----------|--------|--------|--------|-----------|
| Year | ! 1976/77 ! | 77/78 | ! 78/79! | 79/80! | 80/81! | 81/82 | ! 82/83 ! |
| Boxes | ! 13,752 | ! 10,279 | ! 11,583! | 5,899! | 6,062! | 10,519 | ! 5,375 ! |

Remark : (1). 1981/82 is considered to be the peak production year since the outbreak of pebrine disease, blessed by the constant rainfall throughout a year .

(2). Consumption of eggs in 1982/83 sharply dropped due to the prolonged dry season.

As the result, it is estimated that the capacity of silkworm rearing in South Sulawesi at present is below 15,000 boxes a year. It is also estimated that newly planted mulberry field can start supplying mulberry leaves one year after planting.

(2). On limited number of sericultural farmers :

As of May, 1983, there were 6,624 sericultural farmers in South Sulawesi.

Though we don't have reliable data for the past, it is recorded that there were 6,107 sericultural farmers in August, 1982.

Data show us some increase in the number of sericultural farmers though there is some doubt about the reliability of the data. However even if these data are true, the increase in the number of sericultural farmers is quite slow suggesting some difficulties in the rapid increase of sericultural farmers in the near future.

(3). On limited (non-expanding) rearing capacity of farmers :

Since average rearing capacity of a rearing room of each sericultural farmer is estimated to be around 0.8 box per period in the year 1982, 6,624 sericultural farmers are estimated to have the rearing capacity of around 5,299 boxes per period or 31,794 boxes per six rearing periods a year.

However, as shown in the previous table, this capacity has not been utilized effectively. It is assumed that rearing activities are carried out only twice to three times a year in some areas disturbed by the short supply of mulberry leaves caused by the long dry seasons, while eight to ten times or even more frequent rearing activities are also seen in some other areas.

In addition, their rearing places are mostly under the elevated floors of their houses, making the cleaning, the disinfection, and the expansion of rearing places difficult.

(4). On low (non-improving) technical level of farmers, thus poor productivity of raw silk per box of silkworm eggs :

Despite of the completed set of sericultural techniques and the efforts made by the Project in diffusing those techniques, technical level of ordinary sericultural farmers is still low, resulting in the insufficient employment of improved sericultural techniques thus bringing about the poor production of cocoons.

It is estimated that the sericultural farmers who are producing more than 15 Kg of cocoons per box are few.

In mere calculation, if 15 Kg of cocoons are produced per box, 10,000 boxes of silkworm eggs can produce 150 tons of cocoons or 19.5 tons of raw silk (raw silk percentage 13 %). However, in the year 1981/82, 10,519 boxes of silkworm eggs were estimated to have produced 16.7 tons of raw silk, showing little below the expected harvest.

On the other hand, demonstration farmers of Pilot Units, conducted under ATA -72 program, have been harvesting more than 15 Kg of cocoons per box continuously since the start of Pilot Unit activities started more than one year ago.

Therefore, it is believed that we can make the cocoon production of farmers higher and stable, by improving the technical level of sericultural farmers up to the technical level of demonstration farmers.

(5). On limited supply of essential materials and tools needed for sericultural activities :

Some materials & tools are doubtlessly needed to perform successful silkworm rearing activities.

Without those essential materials & tools, farmers surely face the difficulties in increasing their cocoon production even if the improved rearing techniques are well accepted by them.

However in many cases, it is also probably true that farmers do not have enough economical abilities to purchase those essential materials and/or tools even if supplied abundantly, while in other cases, those essential materials and/or tools cannot be purchased in certain localities.

- (6). On unstable and low price of raw silk produced by farmers :

The price of raw silk produced by farmers was below Rp. 15,000,- per kilogram at one time in Soppeng in 1983.

Such low raw silk price was probably caused by the huge import of spun silk in 1981/82.

- (7). On limited (non-increasing) or unstable silkworm egg supply :

As our record shows, the production of silkworm eggs in the project reached 9,718 boxes in 1981/82 achieving the peak production so far.

Of course, this amount was not enough for the sufficient supply of eggs to sericultural farmers, and therefore the rest was imported in the past.

In addition, the Project had been incapable of producing constant amount of silkworm eggs consecutively throughout a year, due to the loose-control of egg production workers, obscure responsibilities, imperfect understanding of rearing & egg production techniques and some disturbances from inside & outside of the Project.

In mere calculation, the Project is estimated to have the egg production capacity of about 15,000 boxes per year at present, and this figure may be able to be increased up to 40,000 boxes with contract parent silkworm rearing farmer system in the near future.

However, the employment of contract farmer system cannot be materialized so immediately until experiments on the system show affirmative results.

- (8). On insufficient vigorousness of project silkworm varieties for the present conditions of silkworm rearing activities of farmers :

As being blamed by some sericultural farmers, project silkworm varieties are, probably to some extent, susceptible to some silkworm diseases, if proper disinfection & other preventive measures are not taken at the proper time.

Under the actual rearing conditions of sericultural farmers, those proper measures might be too difficult to be materialized in some cases.

B. Discussion :

We have pointed out eight major problems disturbing the increase of raw silk production in South Sulawesi.

Of these eight problems, five of them (1 - 5) are problems in which farmers are deeply concerned, and two of them (6 - 7) are the problems of the Project, while another one (8) is the problem of both farmers & the Project.

Here, we would like to know what possibilities and impossibilities are existing in the respective problems.

(1). For limited acreage of mulberry fields :

This means the acreage of farmers' mulberry fields is not big enough or their mulberry fields are not healthy enough.

Acreage can be expanded and mulberry fields can be made healthy and productive if farmers recognize the advantage of sericultural business. Of course, sericultural techniques have some roles to play on them.

(2). For limited number of sericultural farmers :

Doubtlessly, number of sericultural farmers increases or declines with the fluctuating interests of farmers on sericultural business.

(3). For limited (non-expanding) rearing capacity of farmers :

It is probably difficult to expand the rearing capacity of each farmers so rapidly, since most of the rearing activities are carried out under the elevated floors of farmhouses.

There seems to be not so much possibilities that independent grown silkworm rearing houses be built by farmers.

However, it is very clear that total rearing capacity can be increased if number of sericultural farmers increases.

(4). For low (non-improving) technical level of farmers, thus poor productivity of raw silk per box of silkworm eggs :

Low technical level can be improved only through technical extension activities, training and/or seminars.

(5). For limited supply of essential materials & tools needed for sericultural activities :

Acceptance of improved techniques is not so much of practical use if essential materials & tools are not used.

Project has basically developed the sericultural techniques using locally available materials & tools as much as possible. However in certain localities, acquirement of some of the essential materials & tools is difficult, due to no supply (no stock in the shops), no economical power of farmers to purchase or hesitation of farmers to make additional expenditure for the purchase of such materials & tools.

However, it is very clear that increase of the production of cocoons, with present silkworm varieties, cannot be achieved without the employment of improved sericultural techniques supported by the utilization of essential materials & tools.

- (6). For unstable and low price of raw silk produced by farmers :

It is natural that low raw silk price discourages farmers to produce cocoons. Therefore it is especially important to keep stabilized & appropriate raw silk price in order to encourage farmers to carry out sericultural activities.

The raw silk price should be kept little lower than world market price by importing limited amount of raw silk that can fill the shortage of raw silk (Domestic consumption minus Domestic production).

- (7). For limited (non-increasing) or unstable silkworm egg supply :

Silkworm rearing activities, of course, cannot be carried out without silkworm eggs. Therefore incapability in silkworm egg supply means great loss of sericultural farmers.

Project must make its utmost efforts in the increased & stable production and supply of qualified pebrine free silkworm eggs continuously.

However, in case of the inability of the Project to supply enough amount of silkworm eggs, import of eggs must be considered as a temporary measure.

- (8). For insufficient vigorousness of project silkworm varieties for the present conditions of silkworm rearing activities of farmers :

There is a possibility to make silkworm varieties more vigorous through breeding, but it surely takes time, thus cannot be the immediate countermeasure.

Though the Project should not neglect its efforts to improve vigorousness of its silkworm varieties through selection and/or breeding in the long run, it is more realistic to overcome lethal silkworm diseases by improving farmers' conditions on rearing techniques, rearing places, tools & materials for the time being.

After all, even highly resistant & vigorous silkworm varieties cannot be disease-free unless proper techniques are used supported by proper rearing places, tools & materials.

C. Measures to be taken now :

In the preceeding articles, we have pointed out the problems and discussed the possibilities & impossibilities of measures on each problems.

We can now probably say that the measures we can or should take immediately for the increase of the production of raw silk are all within the activities of extension service, since most of the limiting factors are seen on the side of farmers, or can be solved through extension service activities as shown below.

- For (1) - (4) : These conditions can be improved only with the will of farmers.
- For (5) : This problem should be solved between farmers and the Project possibly with the help of third parties.
- For (6) : This problem should be solved by the Government.
- For (7) : Project must supply enough silkworm eggs. But import may be still possible if planned in advance.
- For (8) : Project should make its efforts to make silkworm varieties vigorous though it takes time, but improved rearing techniques can solve this problem at present, too.

In view of such importance of extension service activities, herewith we would like to recommend the following measures that may possibly be taken by the Project in extension service activities (Orders are in order of importance).

(1). Compilation of "Important minimum sericultural techniques" :

Since our "Standard sericultural techniques" are so widely ranged and probably little too hard for some farmers to follow (though they are composed of easily applicable & effective techniques, and their levels are still fairly lower than the sericultural techniques in Japan), let us compile very simple "Important minimum sericultural techniques" for the distribution to guidance technicians and farmers.

This "Important minimum sericultural techniques" should include ;

- a. Simple set of sericultural techniques which are indispensable for all sericultural farmers as long as they rear project distributed and/or similar silkworm varieties.
- b. Therefore higher techniques that may bring even more higher yield are not included in this set of techniques.

This set of techniques should be regarded as the "beginners manual", and for higher technical level farmers, following books can be used.

a. Pedoman Persuteraan Alam

b. Booklets prepared together with sericultural slides.

"Important minimum sericultural techniques" should be distributed to all sericultural related personnel in South Sulawesi including farmers.

- (2). Supply of essential sericultural materials & tools needed to perform "Important minimum sericultural techniques" :

Without the supply of essential sericultural materials & tools, this "Important minimum sericultural techniques" also become useless. there fore, some ways for farmers to be able to buy essential materials & tools should be sought, by farmers themselves, or together with the project, or even with the help of third parties (possibly businessmen).

The Project is not responsible for supplying essential materials & tools to the farmers free of charge, but obliged to seek the way together with farmers to supply essential materials & tools to the farmers with adequate prices.

- (3). Direct control of technical extension activities :

Since technical extension activities require intensive approach, all technical extension activities should be handled under the direct control of Center's Extension Service Division.

Regrettable to say, our district offices are still incapable of performing strong & intensive technical extension activities independently.

Direct control may be carried out for example in the following manners ;

- a. Technical books, pamphlets & information papers should be distributed whenever it is necessary by Extension Division. These books, pamphlets & information papers are desirable to be distributed up to farmers as much as possible.
- b. Routine extension activities of guidance technicians should be inspected more frequently by Center's extension personnel.
- c. Technical & survey reports should be presented by each guidance technicians to the Extension Division mandately.
- d. There should be a consultation meeting among guidance technicians & Center's extension personnel in each district office in every one or two months.

- e. Smooth information system between Extension Division and guidance technicians should be established in order to grasp any problems and apply appropriate countermeasures immediately.
 - f. Utilization of "Extension Advisory Group" should be considered.
- (4). Routine extension service activities centering chief guidance technicians in each district offices :
- Each district office has its chief guidance technician. Chief guidance technician should be responsible for all technical guidance activities carried out within each Kabupaten. Guidance technicians in each Kabupatens should meet and discuss, report, evaluate & plan at least twice a month.
- (5). Distribution of silkworm eggs at the proper time in each Kabupaten or group of Kabupatens :
- Survey for the time & frequency of egg distribution should be carried out, and decided after thorough consultation with sericultural farmers in each Kabupaten or group of Kabupatens.
- System of order and distribution of eggs should be re-studied for smoother distribution.
- (6). Training :
- All training courses are desirably practical oriented. For example, following training courses are recommended.
- For guidance technician :
- a. General technical training course
 - for all guidance technicians at Center or Sub-Center,
 - once a year.
 - short term with technical ability tests on them.
 - b. Intensive technical training course
 - for high level guidance technicians at Center
 - long term . . . one to two months
 - c. Basic technical training course
 - for beginners (new guidance technicians).
 - long term . . . two to three months or even more
 - at Pilot Units or training unit (Luppange Pilot Unit).
 - Those who failed in the technical ability tests should be also included.
- For sericultural farmers :
- a. Intensive technical training course
 - for sericultural leaders of each localities.

- long term
- at Center, Sub-Center or Pilot Units
- b. General training in each localities
 - for all sericultural farmers
 - short term
 - at any pilot unit or demo. unit.
- c. Limited training in each unit or group of units
 - for one to several units (especially new units)
 - short term or long term
 - at each locality

(7). Periodical consultation meeting in each Kabupaten :

Extension service activities are not conducted by the project personnel alone, but conducted in relation with sericultural farmers. This means that any extension activities cannot be one-sided activities.

Therefore, it is very much advisable if the Project personnel and farmers sit together and discuss the problems, prospects and plans in each Kabupaten or group of Kabupatens at least once a year.

(8). Introduction of improved feet-operated reeling apparatus and cocoon drier :

Sericultural activities are not perfect unless raw silk is reeled, thus introduction of improved feet - operated reeling apparatus and cocoon drier is doubtlessly important from now on.

It is suggested that improved feet-operated reeling apparatuses and cocoon driers are sent to each Kabupatens for the demonstration of their capability together with relating techniques.

Fresh cocoons are the source of pathogens. Therefore, they would surely contaminate rearing places and/or silkworms if they are reeled in or around rearing places, thus pupae and their pathogens should be killed by cocoon heating process in order to avoid rearing places and silkworms from contamination with pathogens.

(9). Collection of reliable data :

Collection of reliable sericultural data is indispensable for the programming of futher sericultural development plan.

System of data collection should be re-considered, and data should be colleted periodically, so that data can be more reliable by comparing old & new data, and by training guidance technicians practically in data collection.

As stated previously, factors limiting the expansion of sericultural activities are quite many.

Therefore, sericultural development plan should be compiled based on the reliable sericultural data, and finalized after thorough discussions with field extension personnel as much as possible.

(10). Public relation on newspapers :

It is also advisable to inform the people of South Sulawesi about our activities through newspapers.

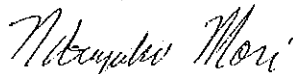
Though detailed extension or information service cannot be conducted in newspapers, this information medium can help us to convince and/or remind the people of South Sulawesi in general, thus making our activities even more smoother and effective.

D. Conclusion :

we believe that the development of sericultural industry in South Sulawesi is now depending on the activities of Extension Service Division of the Project, since most of the limiting and/or disturbing factors are on the side of farmers.

Therefore it is earnestly desired that every possible measures be taken by the project so as to convince the farmers to improve their sericultural activities technically, managerially and materially.

Yours truly,


Nobuyuki Mori

Team Leader for-
Japanese Expert Team.

- CC : 1. Director General, Directorate General of Reforestation & Rehabilitation.
2. Director, Directorate of Regreening & Arable Land Control.
3. Division Chief, Extension Division, Sericultural Development Project.
4. All other concerning chiefs & personnel.
5. File.--

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