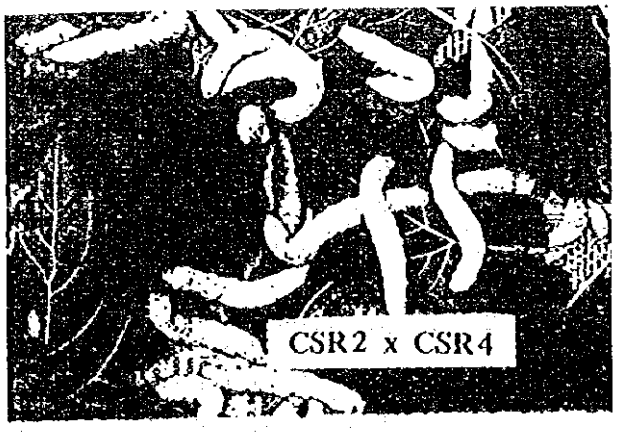
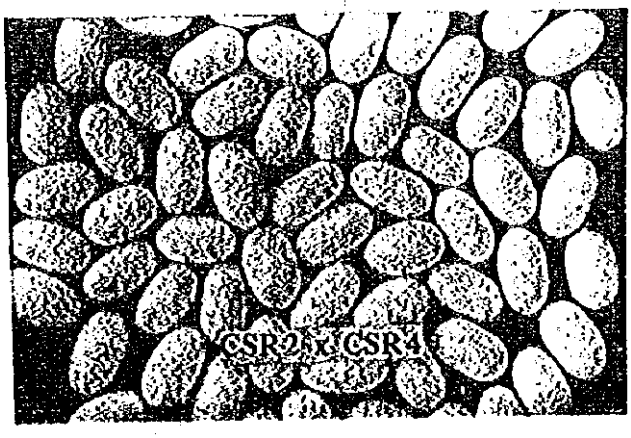
4. Performance of new hybrid in the laboratory

Hybrid	Hatchability(%)	LarvalPeriod (D·hr)	Pupation Ratio(%)	Cocoon Yield Wt. (kg)
CSR2×CSR4	96, 6	23:00	96, 5	19, 410
KAXNB4D2	95, 8	23:00	93, 8	19, 089

Hybrid	Cocoon Wt. (g)	Cocoon Shell Wt. (cg)	Cocoon Shell Ratio (%)
CSR2×CSR4	1. 98	46. 5	23. 5
KAXNB4D2	1. 99	40. 7	20. 5

Hybrid	Filament Len. (m)	Raw Silk(%)	Filament Size(d)	Reelability(%)	Neetness (point)
CSR2×CSR4	1147	20, 0	3, 18	85	94, 4
KAXNB4D2	1035	17, 2	3, 00	81	93, 3





Research achievement

Index method to select promising silkworm breeds/combinations

Department : Silkworm Breeding

Expert : Y. Mano

Counterparts : H.K.Basavaraja
S.Nirmal Kumar
N.Mal Reddy

Abstract:

An index for multiple trait selection for silk yield improvement. The evaluation index is calculated for each trait of each hybrid as given below:

$$E.I. = \frac{A - B}{C} \times 10 + 50$$

where,

A = Value obtained for a particular hybrid combination for particular trait

B = Mean value of a particular trait of all the hybrid combination

C = Standard deviation of a particular trait of all hybrid combinations

10 = Standard unit

50 = Fixed value

1. Decision based on the multiple trait spanning the entire growth period.

2. Effective in identifying the potential crosses

3. Shortlisting of the crosses by this method will add efficiency and speed to the breeding work

Remark : E.I. has to be calculated separately for negative traits

Keywords : Evaluation Index, crosses

TABLE 10-1 : VALUES FOR VARIOUS ECONOMIC TRAITS OF BIVOLTINE HYBRIDS (NOV-DEC'93)
育成系統の交雑種試験成績

SL NO	NAME OF HYBRID	PUP. RATE (%)	COC. WT. (g)	SHELL WT. (cg)	SHELL RATIO (%)	RAW SILK (%)	FIL. LEN. (m)	REELA-BILITY (%)	NEAT-NESS (pt)
1	A3xB910	92.3	2.11	45.3	21.5	17.7	1086	84	86.0
2	NB4D2xA3	98.2	2.13	45.7	21.4	17.7	1144	71	87.4
3	A4xNB18	94.7	2.20	46.2	21.0	17.1	1186	82	87.0
4	NB18xA4	95.6	2.24	45.3	20.2	15.2	1025	81	87.0
5	A6xB9	92.8	2.11	45.5	21.6	18.9	1088	73	91.5
6	B9xA6	97.6	2.16	45.6	21.2	16.5	1031	81	93.5
7	J14xA21	72.4	2.26	54.0	23.9	19.4	1271	79	87.0
8	A21xNK26	90.2	2.34	50.8	21.7	18.2	1271	78	91.3
9	A23xB25	84.4	2.27	48.2	21.3	17.3	1131	72	90.0
10	B25xA23	84.3	2.36	49.0	20.8	18.1	1246	71	88.0
11	A24xB24	71.1	2.31	50.3	21.8	16.7	1147	78	89.1
12	A24xNB4D2	85.1	2.22	48.7	22.0	18.8	1191	72	83.0
13	NB4D2xA24	87.5	2.18	47.3	21.7	17.9	1239	66	85.6
14	A25xB24	82.4	2.29	48.8	21.4	16.9	1201	77	88.5
15	B24xA25	91.6	2.19	46.7	21.3	17.8	1187	72	86.0
16	CC1xNB4D2	89.4	2.10	45.2	21.5	17.3	1231	58	85.5
17	NB4D2xCC1	88.7	2.10	45.6	21.8	17.5	1265	78	87.5
18	NB7xNB18	89.1	2.09	42.7	20.5	16.6	1026	89	89.0
19	KAxNB4D2	86.1	2.07	41.9	20.2	17.1	1040	89	90.5
	Mean	88.1	2.2	47.0	21.4	17.5	1158	76	88.1
	Std	7.1	0.1	2.8	0.8	0.9	85	7.4	2.5

TABLE 10-2 : EVALUATION INDEX FOR MAJOR SILK CONTRIBUTING TRAITS OF BIVOLTINE HYBRIDS (NOV-DEC 93)
偏差値による交雑種試験成績の評価

SL NO	NAME OF HYBRID	PUP. RATE	COC. WT.	SHELL WT.	SHELL RATIO	RAW SILK	FIL. LEN.	REELA-BILITY	NEAT-NESS	AVG
7	J14xA21	28	56	75	81	71	63	54	45	59.3
8	A21xNK26	◎ 53	64	64	54	58	63	53	63	58.9
10	B25xA23	45	66	57	43	57	60	43	50	52.5
5	A6xB9	○ 57	41	45	53	66	41	46	64	51.5
14	A25xB24	42	59	56	50	43	55	51	52	51.1
6	B9xA6	63	46	45	48	39	34	57	73	50.6
3	A4xNB18	59	50	47	45	46	53	58	45	50.5
17	NB4D2xCC1	51	40	45	55	50	62	53	48	50.4
12	A24xNB4D2	46	52	56	58	64	54	45	29	50.3
9	A23xB25	45	57	54	49	48	46	45	58	50.2
11	A24xB24	26	61	62	55	41	48	53	54	50.0
15	B24xA25	55	49	49	49	53	53	45	41	49.2
2	NB4D2xA3	64	43	45	50	52	48	43	47	49.1
13	NB4D2xA24	49	48	51	54	54	59	36	40	49.0
1	A3xNB4D2	56	41	44	51	52	41	61	41	48.4
19	KAxNB4D2	47	37	32	35	46	35	68	60	45.0
18	NB7xNB18	51	39	35	39	40	34	68	54	44.9
16	CC1xNB4D2	52	40	44	51	48	58	25	39	44.7
4	NB18xA4	61	54	44	35	24	34	57	45	44.2

Result	2-1

Summary

Title: Improvement of pebrine inspection methods

Field: Silkworm disease control technology	Expert name: Dr. Tadasi Fujiwara Dr. Susumu Utsumi

C/Ps : Dr. M. Baig, Dr. Ananthalakshmi

Item in TIP : (5)-d: Development on method of pebrine inspection

In India, the actual incidence of silkworm pebrine disease was more than 50% in 5th instar diseased larvae in 1991 and 1992. In some grainages pupal inspection is done instead of moth inspection. This will help in the transovarial transmission of pebrine pathogen, ultimately resulting in pebrine infected larvae. In this study, this simple method was devised and applied to the mother moth inspection. Consequently pebrine disease was decreased drastically at farmers level. Inspection method was popularized in silkworm seed production centres. The developed method increased the efficiency of inspection method. As a consequence, the incidence of pebrine disease decreased drastically at farmers level.

Methods: Mother moth inspection by sampling technique.

20 mother moths were added with 0.6% K_2CO_3 (80ml) and homogenised at 5,000rpm for 1 min. by using a mixer. The homogenised material is filtered in cotton and the collected homoogenate is centrifuged for 3 min. at 3,000rpm. The supernatant is discarded and the preciptate is tested microscopically.

Sampling:

In India, 20% sampling is conducted as per legislation. However, as the lot size is small the risk is higher. Hence, like Japan if the lot size is larger than the statistical sampling can be employed for mother moth examination. For the moment, strict mother moth inspection in the grainage is necessary.

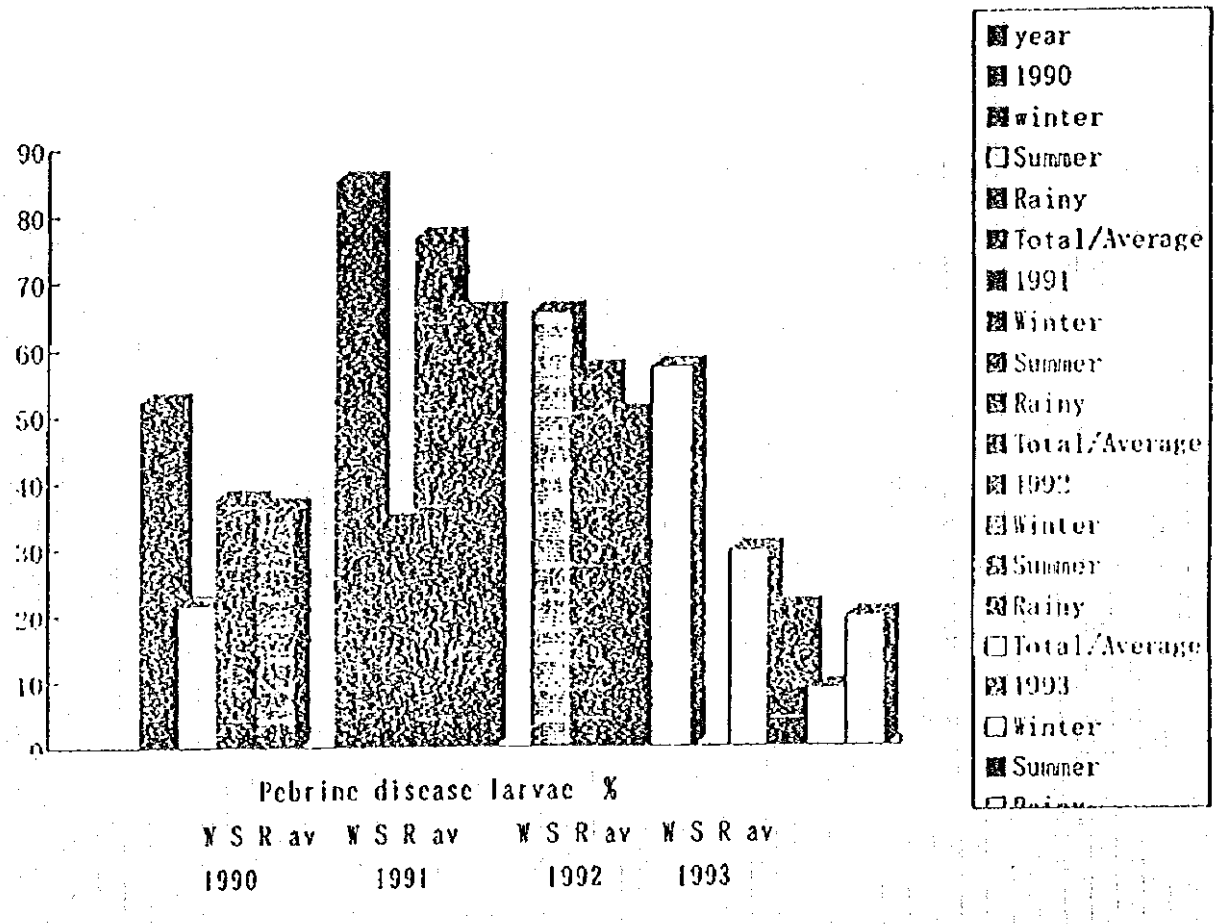


Fig. Pebrine diseased larvae % in various diseased larvae in 5th instar

Result	2--2

I. Summary

Title: Survey on the actual incidence of silkworm diseases with Indian Sericulturists.

Field : Silkworm disease control technology	Expert name: Dr. Susumu UTSUMI

Counter parts: B. Nataraju, V. Sivaprasad

Item in TIP : (3), (5)-Development on prevention methods of viruses and pebrine diseass

The actual status on the incidence of silkworm diseases with farmers was investigated at 4 major silk producing areas in Karnataka state for one year. The relation between the incidence of diseases and actual farmers rearing conditions was established. In winter diseases viz., BmNPV, BmIFV and BmDNV were found. However, few farmers had lost their crop completely due to White muscardine. And the average cocooning was lower than 50%.

During summer, the disease incidence was higher than winter and the cocooning percent was lowest. In Karnataka, winter is considered as a good season for silkworm rearing. In IV and V instar, BmNPV incidence was higher. All Intsars of silkworm larvae were found infected with BmIFV and BmDNV. Two patterns of incidence of diseases (1). high BmNPV and (2). BmIFV and BmDNV were noticed. 90% farmers had silkworm rearing room and human living room under the same roof. Separate silkworm rearing house was with 10% farmers only. 60% rooms were with independent roof and 30% rooms were with out walls being used for human and cattle living. 12.5% farmers floor was made of mud. The 66% rearing room roof was tiled and open mutually and others was with concrete roof. And 70% farmers used the cowdung smeared rearing tray. The above said factors do not provide conditions for perfect disinfection and the disinfection is possible up to 10%. Many farmers take up more than 5-10 rearings per year. No separate mulberry storage room and mountage room were found with any of the farmers. Mulberry is stored in one corner of the rearing room itself and mountage operation is generally conducted outside the rearing house. Presently multi x bivoltine hybrid and parent races are reared with only 50% cocooning against brushing. In future, the introduction of bivoltine hybrid and parent race strictly require the hygienic conditions are necessary as they are sensitive to viruses.

Remarks;

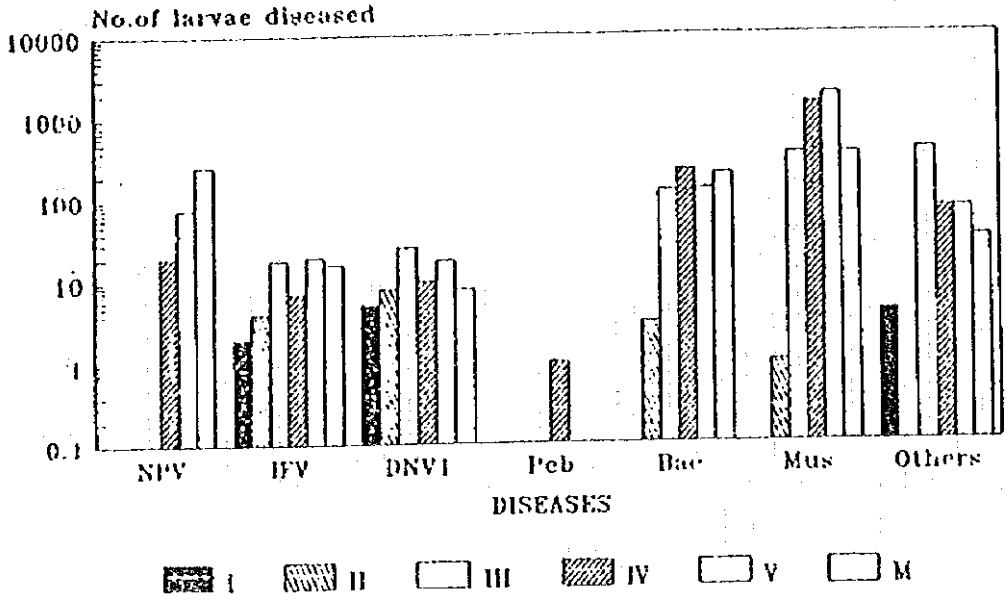
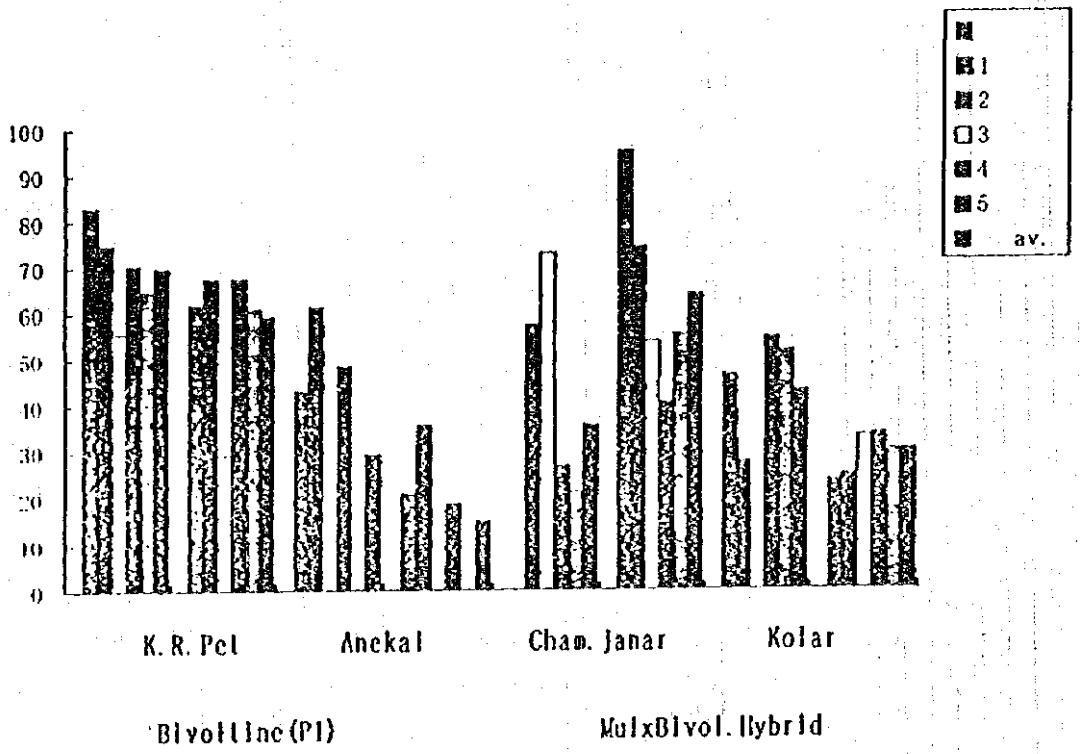


Fig. 1. Prevalence of silkworm diseases During Winter Season 1993 in different larval instars



Cocooning % against brushing larvae in individual farmer

Result	2- 3

I. Summary

Title :Study on the route of infection of silkworm pathogens in farmers conditions

Field :Silkworm disease control technology	Expert: Dr. Susumu UTSUMI

Counter parts :Dr. V. Sivaprasad, B. Nataraju, Dr. M. Baig, Selva Kmar

Item in TIP : (3)Development of control measure against viral diseases,
(5)Development of control measure against microsporidian diseases

Actual disease incidence at farmers level was investigated for one year in 4 major silk producing areas of Karnataka. The high incidence of disease prevalance was found in all the areas. Hence, the prevention/control of these diseases is necessary. The farmers rearing environment was found contaminated with different pathogens (BmNPV, BmIFV, BmDNV, Pebrine and bacteria) by dust examination.

The isolated pathogens from the dusts of rearing room, floor, wall, human living room and cowdung smeared trays were studied. Among them high BmNPV was isolated from cowdung tray and human living room than the actual silkworm rearing place. The survival and prevalance of pathogens was high in these places and the farmers were educated to take preventive measures. The isolated samples were shown each pathogenicity by the bioassay tests and electron microscopic observations were made for confirmation.

Remarks

If, (1) and (2) are followed immediately and (3) and (4) are taken up in the near future good cocoon harvests can be made by Indian farmers. They are

(1). Stop usage of cowdung to smear the rearing tray and floor immediately.
(2). Use working clothes while doing rearing; Wash and disinfect hands and feet.
(3). Construction of independent rearing house and provision for separate mulberry store room and mountage room.
(4). Popularisation of cooperative chawki rearing system.

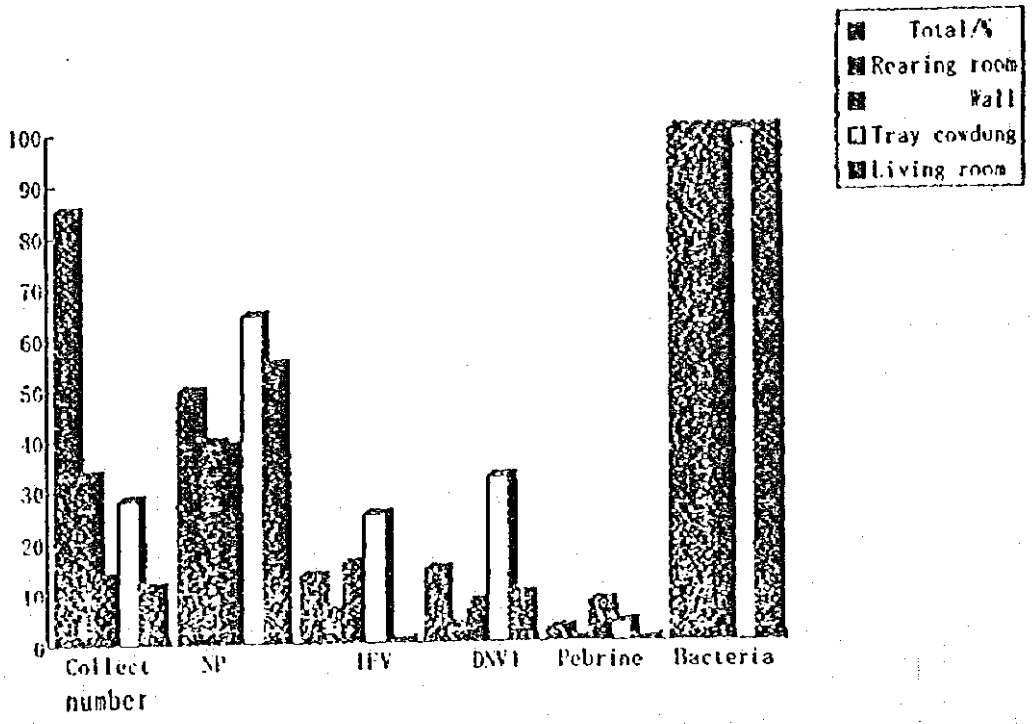


fig 1. Summary of pathogens detected in the dusts collected from farmers Apr, 1994

Table 1. Bioassay of pathogens isolated from dust samples in Summer Season

Pathogen	Farmer No. (district, No.)	Isolated from	% Diseased	Remarks
BmNPV-polyhedra	1. Anekal (1)	Rearing room	40.0	10^7/ml NP
	2. Kolar (9)	Tray c.d.	52.0	
	3. K.R.Pet(1)	Tray c.d.	84.0	
	4. Cham.nargar(2)	Living Floor	72.0	
BmIFV	5. Anekal (7)	Rearing Floor	0.0	
	6. Anekal(9)	Tray c.d.	12.0	
	7. Kolar (6)	Wall	12.0	
BmDNV1	8. Kolar (12)	Rearing Floor	84.0	750dfl; Crops=0

Feeding : just after first ecdysis 60mg/0.2ml/ML 5 cm^2 in concentration of 240mg/1.0ml, 25 larvae were tested. Reared for 2 weeks. NPV larvae were died, but IFV and DNV larvae were not died. No.4 farmer's sample was seen 6-9 NP/field of microscope, therefore the concentration was 100mg/ml and the sample was feed in concentration of 0.2 ml/ML 5 cm2/25 larvae. In No.2 sample, NP were seen in 20/field of microscope, therefore the concentration was 129 mg/ml, feeding concentration was 0.2 ml/ML 5 cm2/25 larvae. In No. 3, 3-4/field of microscope, 25mg/ml. the conc. was used in feeding assay for same treatment.

Result	2-4

I. Summary

Title: Improvement of disinfection techniques.

Field: Silkworm disease control technology	Expert name: Dr. Susumu UTSUMI

Counter parts: Dr. M. Baig, B. Nataraju, Dr. V. Sivaprasad, Selva Kumar

Item in TIP : (3)-b Studies on disinfectant techniques
(5)-b Studies on disinfection methods

In India many farmers looked distrustful at the effectiveness of disinfectants. And also, the qualities of commercial products were not according to the standards and large vairations were available in the market. Therefore, tendency of applying at high concentration to correspond to the appeals by some technical staff. More over, in Indian farmers rearing houses were generally open system, and spraying of formalin solution cannot be continued to kill the pathogens effectively. In general, bleaching powder was applied for disinfection at 5% concentration to disinfect rearing room and the instruments. From the managemnt view point, for effective appliction of bleaching powder solution suitable conditions are important to avoid the damage to instruments.

In this study, the effective and suitable concentration of bleaching powder for disinfection was investigated in the rearing environment.

After understanding the socio-economic conditions of farmers and rearing house and available chlorine content (30%) in commercial bleaching powder in India. However, it was confirmed that 1% bleaching powder was effective in vitro against BmNPV, B. t. spores, pebrine spores and muscardine spores. This was effective in silkworm rearing room conditions just by the addition of 0.3% slaked lime in five hours.

On the other hand in the cowdung smear, BmNPV-polyhedra, pebrine spore and Bacillus spore at large quantities also only 2% fomalin was slightly effective. These pathogens were not killed perfectly by spraying 5% bleaching powder, 2% formalin and sunlight irradiation for 15 hours. And also the disinfecting activity was not shown completely in preparing cowdung smear mixed with bleaching powder, formalin, chlortech, ashipor etc.

Remarks

Presently, applying concentration of bleaching powder for disinfection in rearing room and rearing instruments was changed to 1.0 % from 5.0% in the guidance manual.

Table 1. Disinfection of rearing house by using 1% bleaching powder plus 0.3% lime

Pathogen	Microscopic examination	Bioassay
N. Bombycis spores	-	-
B. bassiana spores	-	-
BmNPV-polyhedra	-	-
B. thuringiensis spores	-	- *

The above solution was spreayed 2l/m^2. The pathogens were exposed for 5 hr in the rearing house (under perfect closed condition). The recovered pathogens fed on to 2nd iost NB18 with 25 larvaee - 3 replications treated.

Table 2. Effect of different disinfectants as spraying agents against nuclear polyhedra in the cowdung.

Disinfectant	Volume ml/cm^2	Time, hours	No. of polyhedra recovered/cm^2	No. of larvae infected	Ratio % infected
Bleaching powder 5%	0.4	5	0.133×10^6	7	35
Formalin 2.0%	0.4	5	0.383×10^6	6	30
Chlortech 0.25%	0.4	5	0.266×10^6	6	30
Virkan-s 1:100	0.4	5	0.233×10^6	9	45
Distilled water	0.4	5	1.633×10^6	18	90
Control(-)				0	0

*Nuclear polyhedra were added 1×10^8/ml cowdung and spread each disinfectant. After kept for 5 hrs at 25 C, polyhedra were recovered from 1 cm2 cowdung strip of 3mm of thickness. Isolated polyhedral samples in bioassay were fed with mulberry leaves against 2nd instar larvae. In each treatment 20 larvae were treated on 3 replications.

Table 3. Disinfecting action to pebrine spores mixed the some disinfectants in the cowdung cake.

	Percentages of disinfectants			
Disinfectants	1.0	2.0	3.0	5.0
Formalin	30.0%	27.5	25.0	18.4
Bleach. powder	21.0	17.5	17.5	15.8
Steridol	100.0	100.0	100.0	100.0
Chloorotech	(250 ppm)	(500 ppm)	(1,000ppm)	
	100.0%	100.0	61.1	
Control(water)	100.0			

(Data showed the infected larvae % in two replicated)

Project NO.	3-1

Subject: Shoot rearing technology for V-instar

Field: Silkworm rearing	Experts : T. Inokuchi, A. Muroga

Counter parts : R.K.Rajan, V.B.Mathur, M.T.Himantharaj, G.B.Singh, G.P.Singh, A.Meenal and C.K.Kamble(Co-oradinator)

Object:

In India, sericulture farmers are having small land holding and adopting leaf feeding method. To conserve the moisture and to reduce the cost on rearing, experiments on shoot rearing was conducted. Experiment was planned to develop a suitable transportation, preservation and also to identify the ideal method for feeding and feeding frequencies.

Results:

1. Shoot transported without any covering showed significantly higher moisture loss (10.67 and 9.65%) compared to other treatments. Among various covering used during transportation, polythene covering showed better cocoon characters than other covering.

2. Vertical position shoot preservation has shown minimum moisture loss ie. 27.67% followed by downward (29.52%) and horizontally (31.17%) preserved batches and rearing and cocoon characters were also superior.

3. If sufficient quantity shoot is given in 2 feeding /day saves 50% labour time compared to leaf feeding without affecting cocoon quality and quantity.

Remark:

During summer when temperature is high and humidity is low, 3 feeding by shoot/day is recommended.

Key-word:

Data:

TABLE 1: EVALUATION OF SHOOT TRANSPORTATION METHODS

Treatment	Moisture loss during transport (%)	ERR No	ERR Weight (kg)	Single cocoon wt (g)	Single shell wt(g)	Shell ratio %
(A) Tractor						
Gunny cloth	7.60	8565	15.551	1.812	0.377	20.93
Urea bag	6.98	8482	15.508	1.816	0.372	20.57
Polythene	5.57	8886	15.778	1.843	0.390	21.09
Open	10.67	8111	13.361	1.784	0.344	19.37
(B) Person						
Gunny clot	7.12	8814	15.258	1.813	0.379	20.90
Urea bag	6.98	8832	15.923	1.845	0.387	20.97
Polythene	5.52	8916	15.992	1.850	0.398	21.51
Open	9.65	8047	14.004	1.796	0.350	19.48
CD at 5%	2.11 *	733 *	1.662 *	0.079 *	0.023 *	1.32 *

TABLE 2: EVALUATION OF SHOOT PRESERVATION METHODS (3 TRIALS).

Treatment	ERR No	ERR Weight (kg)	Moisture loss %	Single cocoon wt (g)	Single shell wt (g)	Shell ratio %
Vertical position	8606	14.384	27.67	1.848	0.354	19.16
Downward position	8566	14.016	29.52	1.792	0.341	19.02
Horizontal position	7850	12.878	34.17	1.764	0.332	18.82
CD at 5%	703 *	1.336 *	3.17 *	0.059 **	0.027 NS	0.31 *

TABLE 3: STANDARDIZATION OF FEEDING FREQUENCIES

Treatment	ERR No	ERR Weight (kg)	Single cocoon wt (g)	Single shell wt (g)	Shell ratio %
2 Feedings	8181	13.508	1.758	0.347	19.68
3 Feedings	8344	14.177	1.758	0.349	19.84
4 Feedings	8873	14.960	1.809	0.360	19.84
CD at 5%	845 NS	1.526 NS	0.074 NS	0.030 NS	0.999 NS

Project NO.	3-2

Subject: Mounting technology suitable for Bivoltine silkworm

Field: Silkworm rearing	Experts : T. Inokuchi, A. Muroga

Counter parts : R. K. Rajan, V. B. Mathur, M. T. Himantharaj, G. B. Singh, G. P. Singh, A. Meenal and C. K. Kamble(Co-oradinator)

Object:

Picking and mounting method of mature worms on suitable cocooning frame contribute significantely in cocoon and reeling characters. Mounting mature worms on bamboo chandrike consumes lot of time and leads to wastage of silk. Hence, to identify a sutable mountage and mounting method with shoot rearing, present study was undertaken.

Results:

1. Jobarai method of mounting saves 38% time compared to pick up method without affecting the cocoon and reeling characters.

2. Cocooning % was 95.22, 90.22 and defective cocoon% was 1.96, 9.12 in rotary mountage and bamboo chandrike(control) respectively. Cocoon and reeling charactors were also recorded superior in cocoon harvsted in rotary mauntage. Hence, it is recommended for better quality cocoon production.

Remark:

1. Shoot should be gently shaken to detach mature larvae and to minimise injury to silkworm while mounting.
2. Vinyl sheet should be used while adopting Jobarai method.

Key-word:

Data:

TABLE 1: EVALUATION OF MOUNTING METHODS

Treatment	Time required to mount 40,000larvae(hrs)	Cocooning %	Defective cocoon %	Single cocoon wt (g)	Single shell wt (g)	Shell ratio %	Avg. Filament length (m)	Reelability (%)
Jobarai	12.67	84.84	5.86	1.91	Ø.392	20.83	1ØØ2	89.53
Self	1.53	86.38	10.82	1.8Ø	Ø.37Ø	20.5Ø	929	81.Ø7
Pick up (Control)	17.53	89.73	4.14	1.92	Ø.398	20.71	1Ø44	9Ø.15
CD at 5%	3.61 **	9.53 NS	3.64 **	Ø.1Ø *	Ø.Ø14 *	2.53 NS	66.56 *	7.13 *

TABLE 2 : COMPARATIVE STUDY OF DIFFERENT MOUNTAGES

Treatment	Cocooning %	Defective cocoon %	Floss %	Single cocoon wt (g)	Single shell wt (g)	Shell ratio %	Avg. flm. length (m)	Reelability %
Rotatory	95.22	1.96	1.76	1.92	Ø.377	2Ø.15	1Ø39	89.96
Plastic bottle brush	93.46	5.92	2.82	2.Ø2	Ø.389	19.15	962	87.29
Bamboo bottle brush	9Ø.74	6.Ø2	2.8Ø	1.99	Ø.396	19.57	934	85.39
Plastic collapsible	89.35	7.96	3.31	2.Ø3	Ø.4Ø6	19.76	884	81.63
Paddy Straw	76.Ø1	14.52	3.46	2.Ø3	Ø.388	19.Ø9	85Ø	83.89
Chandrike	8Ø.22	9.12	4.1Ø	1.89	Ø.388	2Ø.38	993	81.36
CD at 5%	4.91 **	3.22 *	1.29 *	Ø.Ø9 *	Ø.Ø15 *	Ø.446 **	6Ø.47 **	5.56 *

Establishment of mulberry the cultivation package

Expert; Dr.K.Kitaura Mr.K.Hasegawa (mulberry breeding and cultivation)
Counterpart; Dr.Ramakant Mr.S.A.Aqueel

To develope the bivoltine sericulture in India, increasing of profitability is indispensable. To do so, not only much input but also the preparation of well planned mulberry field to get high yield and quality is necessary.
Main factors which decide the productivity of mulberry fields are mulberry variety, planting space, pruning and harvesting, manuaring and irrigation.
We conducted the experiment to clarify the interaction of spacing and manuring, using S36 with shoot harvesting method (shoot growing period was around 70 days) under full irrigated condition.
The leaf yield/ha/year reached to 70 t/ha. The paired row system (90+180X90cm) brought equal or more yield than dense plantation. Moreover the feeding value of the harvested leaves was also high in the pared row system.
The same designed experiment was conducted at RSRS Kodathi and same trend was obtained. Based on these experiments the technical package was established.

Details of the results were as follows.
① The leaf yield increased with increasing of plant population at early crops. However, influence of plant population on the leaf yield decreased crop by crop. After one year or so, the yield reached to the almost same level through the population range from 12,345 to 27,777 plants per hectare.
② The appropriate level of chemical fertilizer was 300-350kg N/ha/year.
Input of 1 kg Nitrogen returned 100-200kg of mulberry leaves.
Fertilizer efficiency was higer with ammonium sulphate than urea under slightly alkaline soil condition.
③ Average leaf yield of 6 crops was nearly 70 t/ha /year in the most dense planting. The yield is twice of the target yield of existing standard technique.
④ Bioassay tests proved that the single cocoon weight and shell weight ratio are higher for the leaves of paired row sysytem than dense planting.
⑤ By shoot harvest method the labour hour for harvesting decreased to 15% of existing leaf plucking method.

(Remarks)
In India, by statistical data, 65% of the total mulberry planted area are under irrigated conditions. So, the adoption of of this technical package will be possible in wide area.
By popularization of this package, high yield and high quality can be expected. Moreover labour saving in harvest is also expected and this will bring big merit to the management of sericulture.
Regional adaptability of this package should be judged by regional testing.

Table1. Effect of the planting space and fertilizer dose on the leaf yield (t/ha/year)

crop	I-B*				I-J				J				I-90				I-60			
	A**	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
1	31.9	34.1	38.3	46.4	36.7	47.8	50.3	55.6	29.5	35.4	37.9	46.2	30.1	37.5	41.5	52.2	48.9	53.1	60.8	65.0
2	37.1	38.1	39.7	41.2	40.8	41.2	44.3	46.4	27.2	28.9	32.5	33.2	32.5	35.1	38.2	42.3	51.1	55.8	63.6	68.7
3	39.3	42.1	39.7	43.8	50.6	54.7	53.9	58.9	47.2	48.4	47.8	51.0	39.9	44.0	42.4	45.7	56.4	69.4	63.9	71.3
4	47.2	49.0	48.7	51.7	64.3	67.2	66.5	68.7	51.0	52.1	50.4	55.4	52.4	56.1	53.9	57.2	76.6	77.3	76.3	83.0
5	57.3	63.4	60.6	70.1	61.7	66.8	66.8	71.0	54.0	52.4	48.6	53.6	59.7	57.6	59.1	59.7	61.4	69.4	61.4	67.1
6	58.1	59.3	53.6	60.1	57.2	66.0	60.9	66.3	49.1	50.0	43.2	51.8	55.5	57.1	54.9	57.6	56.0	62.0	58.8	63.0
aver.	45.2	47.8	46.7	52.2	51.9	57.3	57.1	61.2	43.0	44.5	43.4	48.5	45.0	47.9	48.3	52.5	58.4	64.5	64.1	69.7

variety: S36 : under full irrigation: A,B,C,D shows fertilizer dose :yield/ha/year=yield/cropx365/growing days

* Planting space

plot	spacing(cm)	plants/ha
I-B	90+90+90+270x60	12.345
I-J	90+180x60	12.345
J	180x60	9.257
I-90	90x90	12.345
I-60	60x60	27.777

** Fertilizer application

plot	N	P	K
A	300	120	120
B	350	140	140
C	400	160	160
D	350	140	140

A,B,C- urea D-ammonia sulphate

Date of harvest

1st crop	27/10/1993	70days
2nd crop	7/ 1/1994	70days
3rd crop	26/ 4/1994	90days
4th crop	6/ 8/1994	100days
5th crop	27/10/1994	75days
6th crop	7/ 1/1995	70days

Table.2 Frames of the agronomical package

1. Mulberry variety; S36 or another improved varieties
2. Planting space; I-J type or 27,777-12,345 plants/ha
3. Training,harvesting; base pruning, shoot harvest
4. Shoot growing duration; 70-80 days after pruning
5. Fertilizer; N 350/ p140/ k140 kg/ha/year. 5 split dose. FYM 20t/ha/year6.
6. Irrigation; 6mm per a fine day, onece a week in furrow irrigation

Project No.	5 -- 1

Subject: Loose Egg Production Technology

Field : Silkworm Seed Production

Experts : Dr. K. Tazima , Dr. T. Hashiguchi

Counterparts : Dr. Puttaswamy Gowda, Mr. Vijakumar, Dr. B. A. Parthasarathy.

Object:-

Commercially silkworm eggs are produced on sheet or as loose grains, where as reproductive eggs are generally prepared on paper cards. Production and distribution of loose eggs have certain advantages both qualitatively and quantitatively. In order to provide technical knowhow and infrastructural facilities for the egg producers and farmers side, the present experiment was planned for producing eggs in loose form and to develop suitable equipments .

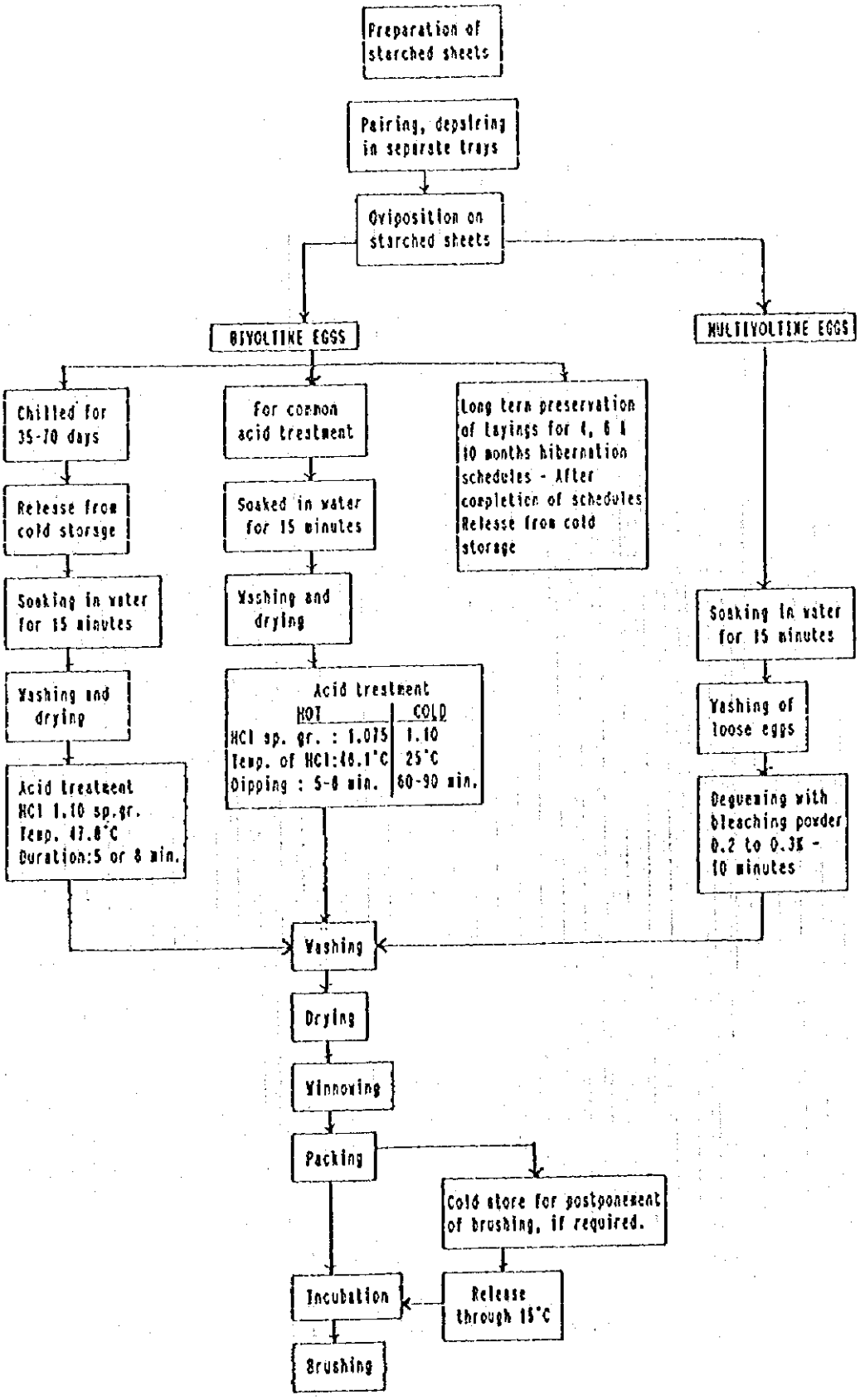
Results:-

1. The important equipments needed for loose egg production such as loose egg washing and oviposition tray, egg drying unit etc. have been fabricated.
2. Loose egg production has been standardized.
3. A comprahensive guideline has been prepared.

Remarks;-

1. Newly developed equipments were supplied to Silkworm Seed Production center, Bangalore in Karnataka and Dehradun in Uttar Pradesh.
2. The training in large scale loose egg production has been given to the private, State Governament and central silk board egg production centers.

FLOW CHART FOR LOOSE EGG PREPARATION



Project No.	6-1

Subject: Operational manual for reelers on Bivoltine silk reeling technology.

Field: Silk reeling.

Experts: Dr. C. Takabayashi, H. Kinoshita, Dr. K. Tsubochi, H. Tsuboi.

Counterparts: G. Hariraj, Subhas. v. Naik, and Dr. T. H. Somasekhar (Co-ordinator).

Object:

In order to propagate Bivoltine silk reeling technology among the reelers in the field to improve the reeling performance and to produce quality raw silk.

Results:

1. Cocoon sorting: Sorting of defective cocoons is essential to improve the quality of raw silk. Cocoon sorting technology has been developed.
2. Cocoon stifling: Hot air drying to the optimum level improves the reeling performance and quality of raw silk. Formala has been developed to decide optimum degree of drying on the basis of cocoon quality.

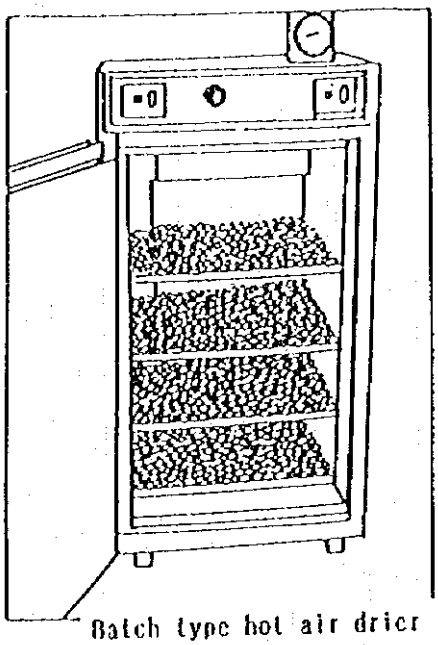
$$\text{Optimum degree of drying}(\%) = \frac{100 - \text{Shell ratio}(\%)}{4} + \text{Shell ratio}(\%).$$

3. Cocoon cooking: 2 pan / 3 pan / pressurised cooking methodology has been developed suitable for bivoltine cocoons to achieve better reeling performance and to produce high quality silk..
4. Reeling: Multiend reeling technology has been developed to reel bivoltine cocoons. Denier detection device has developed to incorporate in multiend reeling machines.
5. Re-reeling: Developmentment of re-reeling machine has been carried out and reel permeation device has been developed.

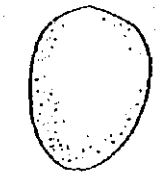
Remarks:

1. Newly developed technology is being propagated in the field.
2. Automatic reeling technology is being developed.
3. Production of denier indicators for commercial usage is under progress.
4. Multiend reeling machines have been established already in the field.

Data



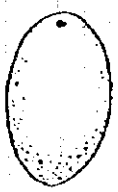
Batch type hot air drier



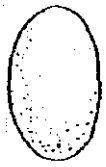
DOUBLE COCOON

OUTER STAINED

FLIMSY



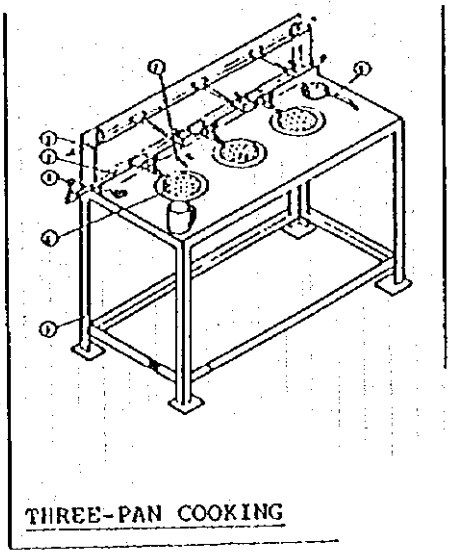
PERFORATED



INNER STAINED

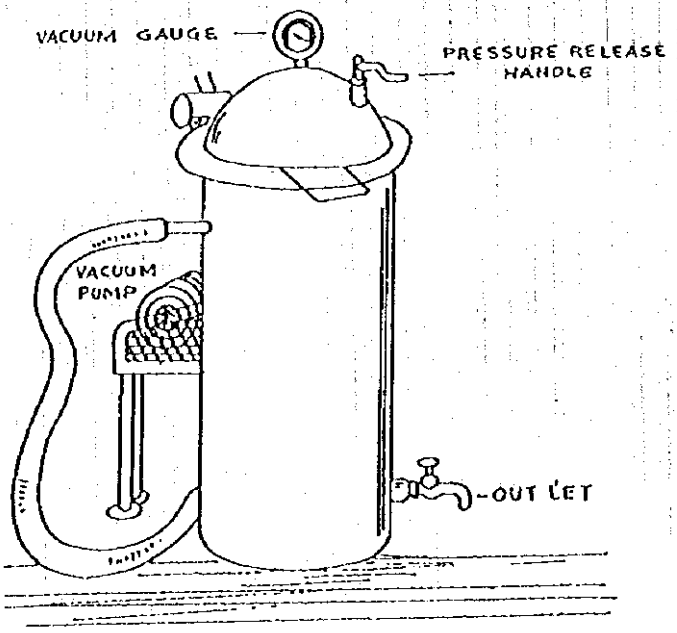
DEFORMED

Sl.No.	Parameters	without sorting	with sorting
1.	Renditta	10.8	8.7
2.	Raw Silk Recovery (%)	51.5	63.5
3.	Waste (%) on silk weight	27.3	22.0



1	Mon frame	5	Ladle
2	Water Supply line	6	Slt waste
3.	Steam line	7	Coolers
4	Cocoon cooking board		

THREE-PAN COOKING



Reel Permeartion Chamber

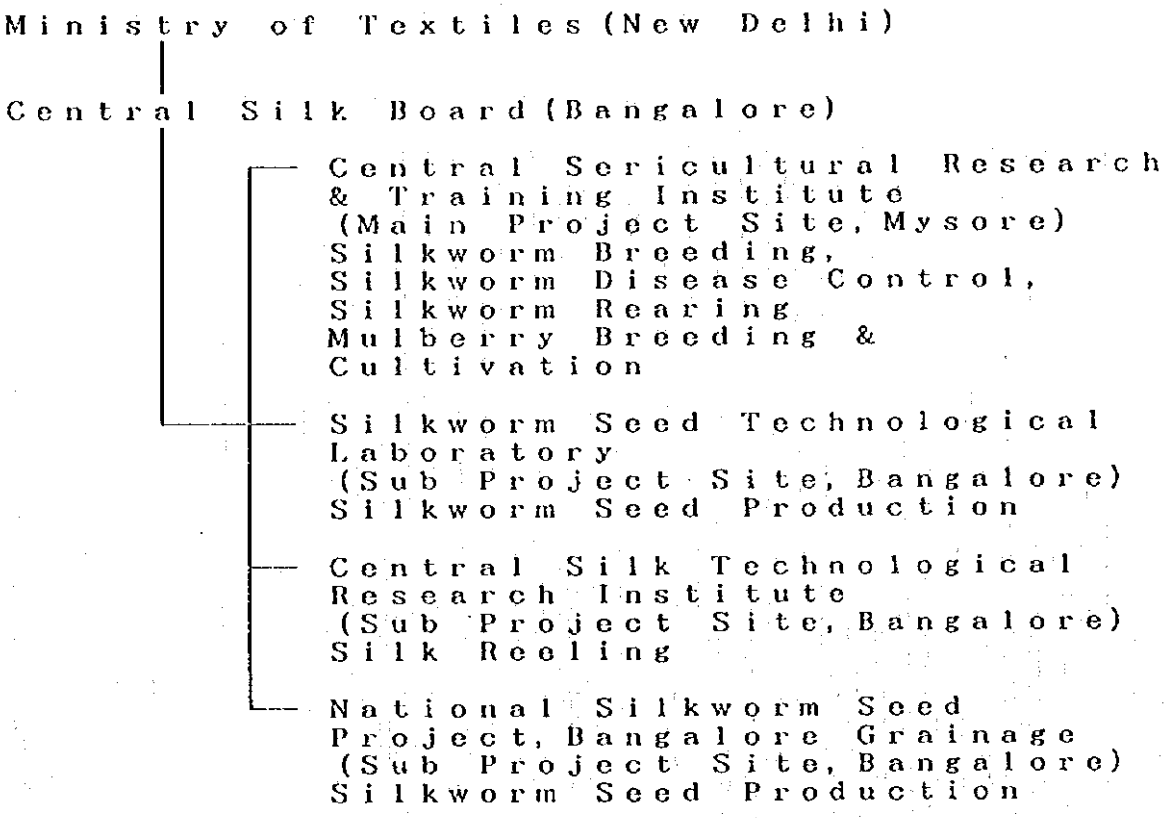
Implementation of Training Courses

ANNEX-12

Item of Activity	Fiscal Year / Month	91 4	7	10	1	92 4	7	10	1	93 4	7	10	1	94 4	7	10	1	95 4	7	10	1
Training Course						1. Silkworm Breeding 10/27—12/23 2. Three Way Cross 2 /18— 3/ 4 3. Pebrine Testing 5 / 4— 13 4. Pebrine Testing 9 / 7— 11				1. Silkworm Breeding 12/13— 1/31 2. Pebrine Testing 5 /24— 29				Mulberry Breeding 6/6 — 7/15				Silkworm Breeding 7/1 — 8/31			

ANNEX 13.

Organization Chart

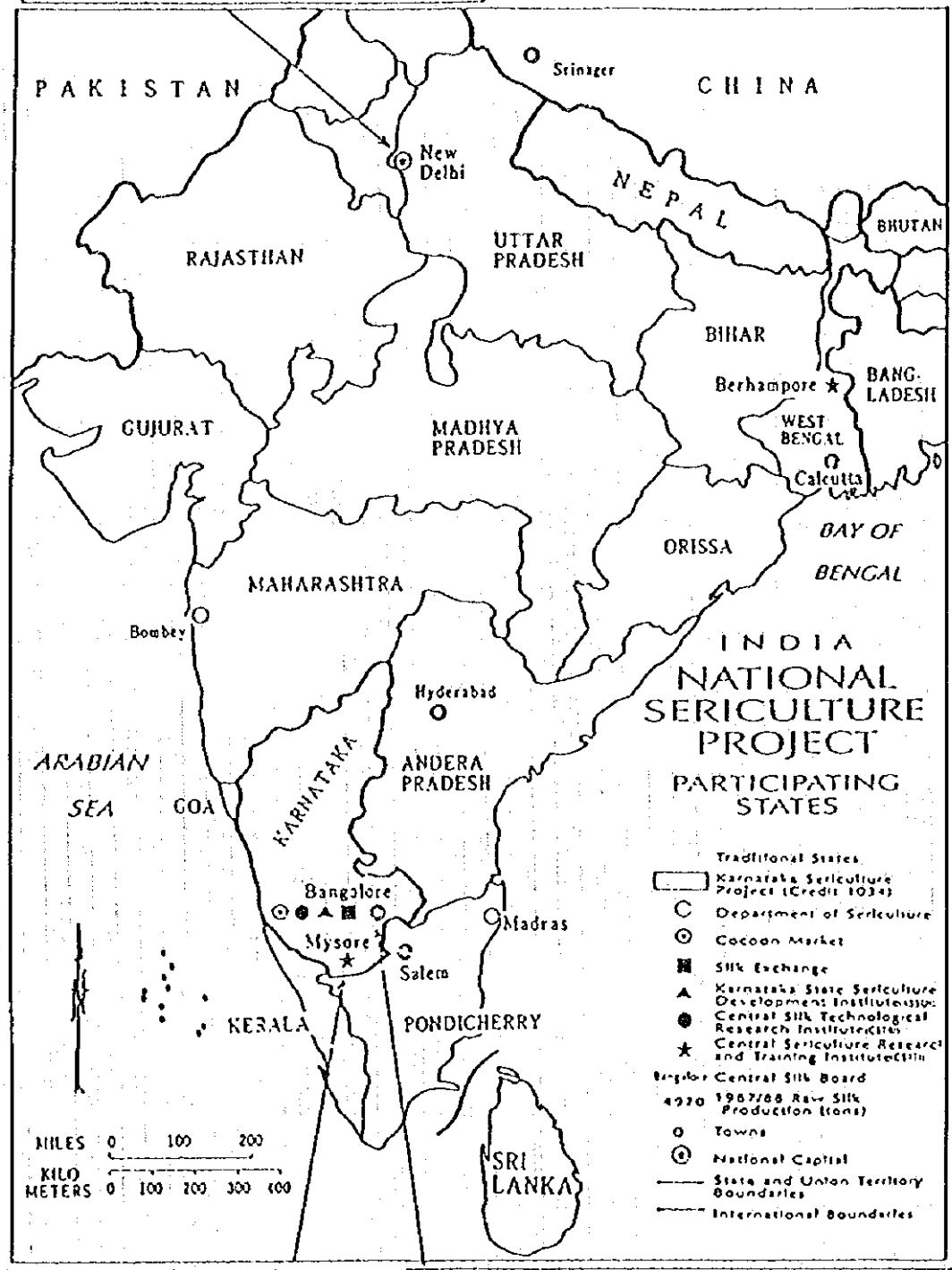


O Distance Between CSB And Its Subordinate Implementation Organizations
  (1) CSB : 0 Km
  (2) CSTRI, NSSP & Its Bangalore Grainage : About 5 Km
  (3) SSTL : About 10 Km
  (4) CSR&TI : About 150 Km

O Map of Implementation Organizations is attached herewith

Location of Project Sites

Ministry of Textiles · JICA India Office



Central Sericultural Research & Training Institute(Main Site)

Central Silk Board
Silkworm Seed Technological Laboratory(Sub Site)
Central Silk Technological Research Institute (Sub Site)
National Silkworm Seed Project, Bangalore Grainage (Sub Site)

2　第５回合同委員会議事録

MINUTES OF THE FIFTH JOINT COMMITTEE MEETING OF THE BIVOLTINE SERICULTURE TECHNOLOGY DEVELOPMENT PROJECT

The fifth Joint Committee of the Bivoltine Sericulture Technology Development Project met at 3 PM on 30.11.1995 at Central Silk Board, United Mansions, No.39, M.G.Road, Bangalore. Since Joint Secretary(Silk), Ministry of Textiles was not able to go over to Bangalore on 30.11.1995, the Member Secretary, CSB was requested to chair the meeting. The list of members participated in the meeting is attached. Annex-1.

The leaders of the Joint Evaluation Teams viz. Mr.Hiroaki Yanagawa, Chief, Japanese Evaluation Survey Team, Japan International Cooperation Agency, Japan and Dr.R.K.Datta, Chief, Indian Evaluation Survey Team, Central Silk Board, Ministry of Textiles, Govt. of India presented the Joint Evaluation Committee Report.

The Joint Committee took on record the Joint Evaluation report and suggested that the CSB and JICA take follow up action on the recommendations.

Bangalore
November 30, 1995

[ARUN RAMANATHAN]
MEMBER SECRETARY
CENTRAL SILK BOARD
UNITED MANSIONS, II FLOOR
NO.39, M.G.ROAD
BANGALORE-560001

Chairman of the Fifth
Joint Committee Meeting

LIST OF MEMBERS PARTICIPATED IN THE JOINT COMMITTEE MEETING OF BSTD PROJECT ASSISTED BY JICA AT BOARD ROOM OF CSB, M.G.ROAD, BANGALORE ON 30.11.1995

Indian Side

1) Shri Arun Ramanathan — Chairman
Member Secretary
Central Silk Board
BANGALORE

2) Dr.R.K.Datta,
Director,
Central Sericultural Research & Training Institute,
MYSORE.

3) Dr.T.H.Somashekar,
Director,
Central Silk Technological Research Institute,
BANGALORE.

4) Dr.M.V.Samson,
Director,
Silkworm Seed Technological Lab.,
Kodathi,
BANGALORE.

5) Dr.K.Thangavelu,
Director,
National Silkworm Seed Project,
Bangalore.

6) Dr.S.Raje Urs
Joint Director
Central Silk Board
BANGALORE

1) Dr.Yoshiki Ohtsuki
JICA Team Leader,
BSTD Project,
CSR&TI,
MYSORE.

2) Dr.Jiro Obitsu,
Coordinator,
BSTD Project,
CSR&TI,
MYSORE.

3) Resident Representative
JICA, NEW DELHI

4) Mr.Hiroaki Yanagawa
JICA Evaluation Team

5) Mr.Osamu Ninagi
JICA Evaluation Team

6) Mr.Kesao Yanagisawa
JICA Evaluation Team

7) Mr.Toshio Naoi
JICA Evaluation Team

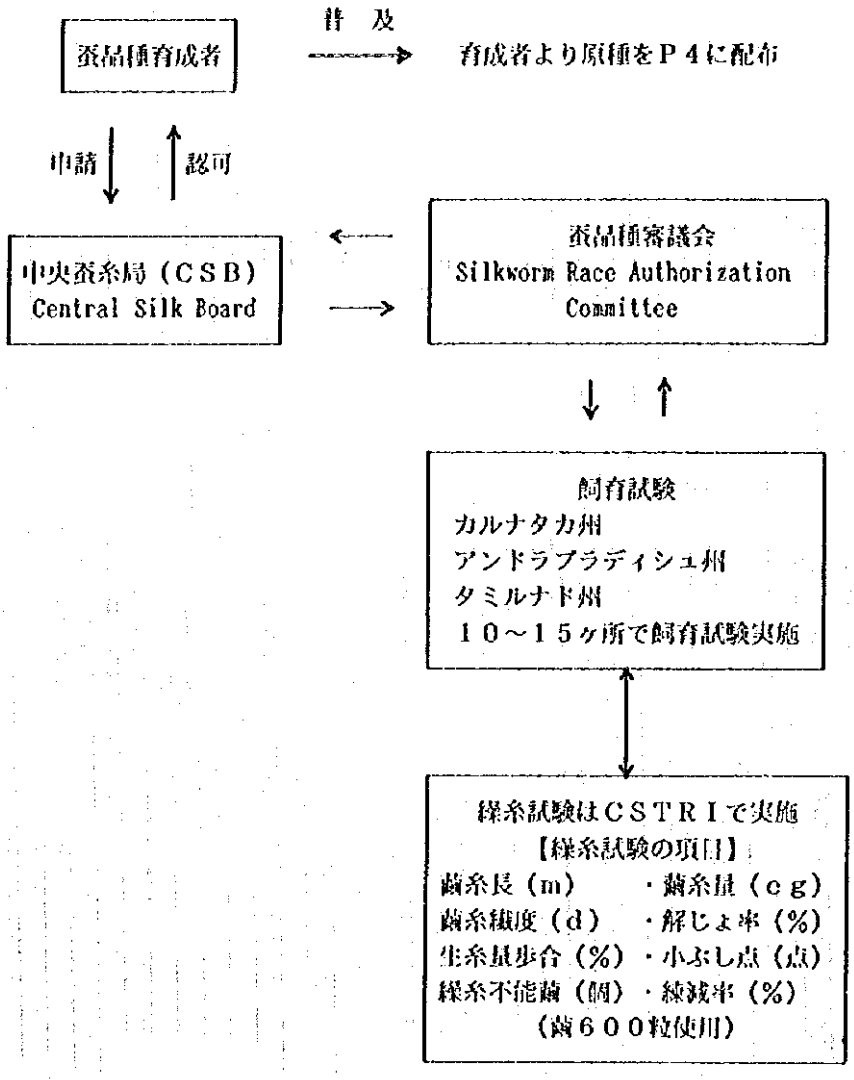
8) Mr.Yutaka Sato
JICA Evaluation Team

9) Takayuki Ando
JICA Evaluation Team

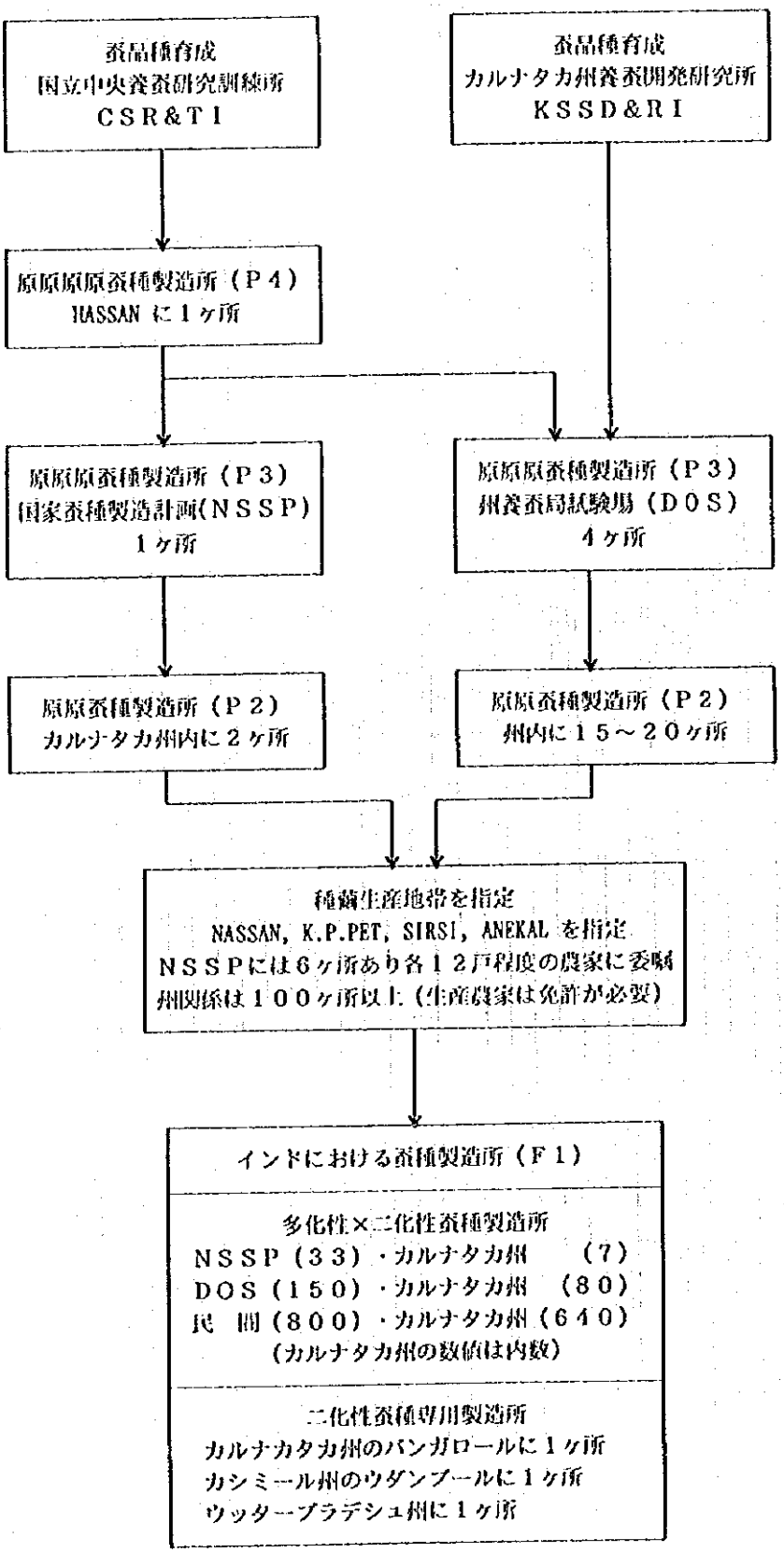
INVITEES

10) Representative
Embassy of Japan
New Delhi

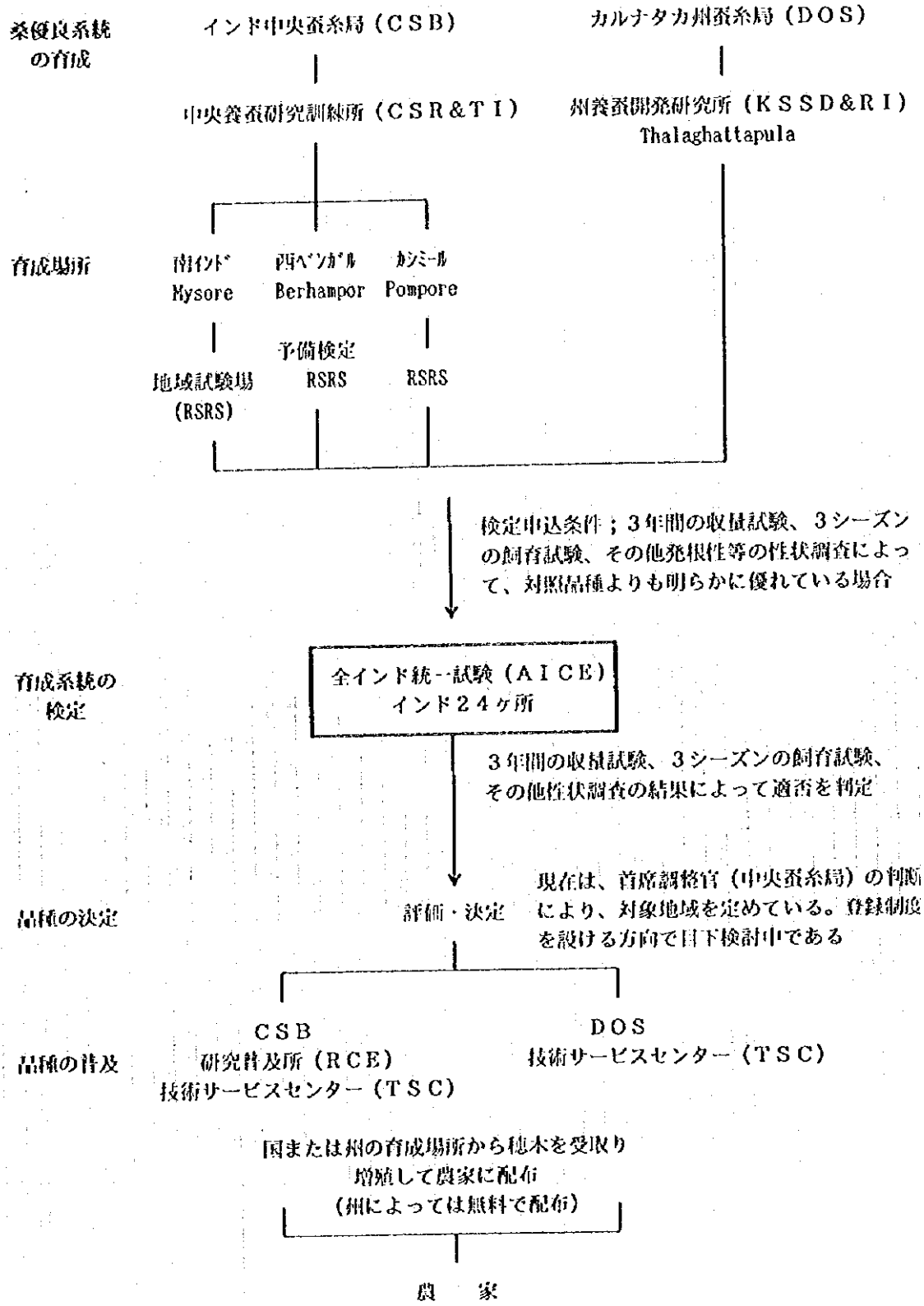
3　インドにおける蚕品種指定制度



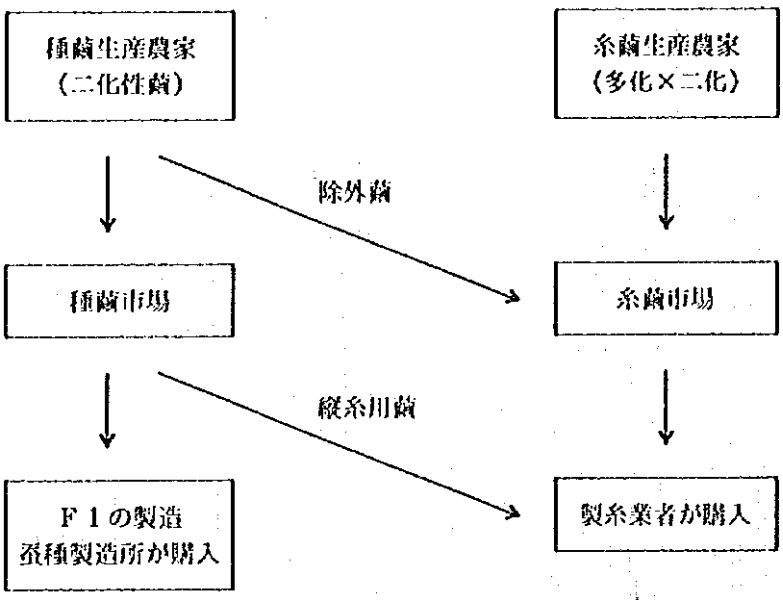
4　インドおよびカルナタカ州における多化性×二化性蚕種製造の流れ



5　インドにおける桑の品種育成と普及組織



6　インドにおける繭の流通経路



7　インドにおける多化×二化性生糸の検査基準（国際規格Ｃ～Ｄ格）

（ＣＳＴＲＩ作成）

検査項目	寄与率
１．肉眼検査（Visual）	１０％
２．繊度偏差（Size／Deviation）	４０％
３．再繰切断（Winding brears）	４０％
４．最大偏差（Max. deviation）	１０％
合　計	１００％

最高を１００％として、減点制で品質を評価する
なお、インドの二化性繭は国際規格で２Ａ程度

8　インドにおける生糸の流通事情

1．インドにおける生糸の年間消費量は約2万ﾄﾝで、国内で生産される生糸量は約1．5万ﾄﾝである。このため、年間約5，000ﾄﾝの生糸が中国やブラジルから20$／kgで輸入されている。また、インド国内で生産される二化性の生糸は国家養蚕計画で定められた目標1，000ﾄﾝのうち、150ﾄﾝ～400ﾄﾝ程度である。

2．生糸取引に係わる法律は1958年～1960年にかけて州政府が制定した。生糸取引は生糸取引所を通じて行うが、全て現物取引であり、先物はない。この生糸取引所は州政府に所属し、カルナタカ州ではバンガロールにある。

3．インド全体で5ヶ所の生糸検査所（Silk Condition Test House）があり、生糸市場と生糸検査とが一体となって運営されている。しかし、生糸業者の大部分は生糸購入後に価格の妥当性を判断する手段として生糸検査を利用しているのが実状である。

4．生糸市場を通して売買される生糸の割合は25～27％程度であり、手数料は取引価格の1％である。残りの72～73％は生糸業者と織物業者との直接取引（銘柄取引）となっている。1994年に検査された生糸は15，000ﾛｯﾄで、全体の5％程度である。

5．生糸市場で取引される生糸のうち15％程度（全体の4％程度）は政府の価格維持政策に利用されている。すなわち、生糸1kg当たり1，200ﾙﾋﾟｰ（4，200円）に対して上下50ﾙﾋﾟｰ（175円）の範囲で価格支持を図っている。このような支持制度はカルナタカ州やアンドラプラデシュ州で実施されている。

6．インドの町工場で生産される多化×二化蘭の生糸品質は国際規格ではC～D格程度である。しかし、インド国内で育成された二化性品種（NB4D2×KA及びNB4D2×CC1）の生糸はA格、本プロジェクトで育成された二化性品種（CSR2×CSR4及びCSR2×CSR5）の生糸は2A格以上となっている。

9　インドにおける種繭の流通事情

1．種繭生産には免許（パスポート）が必要である（糸繭生産も同様）。

2．多化×二化蚕種製造用の二化性繭は価格が支持され、繭1kg当たり７００粒で平均２３０ﾙﾋﾟｰ（８０５円）となっている。この1kg当たり粒数は少ないほど買い入れ価格が高くなるが、kg当たり５５０粒以下は購入しない。

3．１９９５年は種繭が不作で1kg当たり８００～９００ﾙﾋﾟｰ（2,８００～3,１５０円）に高騰したと言われている

4．種繭市場では蛹検査を実施し、1粒でも微粒子病に汚染されていれば、乾繭して糸繭市場に出すこととなっている。

5．タミルナド州では種繭取引に関して法律を定め、健蛹歩合、繭層重、繭層歩合、繭重等を指標に、取引所で価格を決めている。

10　プロジェクト方式技術協力事後現況表

作成年月日：19 | 96 | 1 | 29

1．プロジェクト名

和：インド二化性蚕蛾技術開発計画
英：Bivoltine Sericulture Technology Development Project in India

1）所在地　：カルナタカ州マイソール市（メインサイト）
　　：カルナタカ州バンガロール市（サブサイト）
2）先方関係機関　：繊維省中央蚕糸局
3）我方協力機関　：農林水産省

2．

1）R／D等署名日　：1991．4．16
2）協力期間　：1991．6．1～1996．5．31

3．調査団派遣

報告書提出

1）コンタクト調査	1988.11.30 ～	1988.12.11
2）長期調査	1989.10.18 ～	1989.11.15
3）コンタクト調査	1990. 4. 9 ～	1990. 4.25
4）長期調査	1990. 7.25 ～	1990. 8. 7
5）実施協議	1991. 4. 6 ～	1991. 4.18
6）計画打合せ	1992. 3.15 ～	1992. 3.26
7）巡回指導調査	1993.11. 3 ～	1993.11.17
8）巡回指導調査	1994.12. 4 ～	1994.12.16
9）終了時評価調査	1995.11.20 ～	1995.12. 3

4．背景・経緯

インドにおける生糸の需要は高い伸びを示しており、同国政府は国内生産をこれに見合ったものにするために世銀等の融資を受けて、国家養蚕開発計画プロジェクトを広範囲にわたって実施中である。このうち高品質生糸生産に必要な二化性養蚕に係る技術については、インド国内では十分な蓄積と経験がないため、この分野で先進国である我が国の協力を要請してきた。

この要請を受けて、我が国は以次の調査団を派遣し（1988年12月コンタクト、1989年10月長期調査、1990年4月コンタクト、1990年7月～8月長期調査）、本件協力計画につき事前の協議及び検討を重ねてきた。この調査結果を踏まえ、1991年4月には実施協議調査団が派遣され、同調査団とインド側の間でR／D及びTIP（暫定実施計画）を締結、同年6月より5年間の期間をもって、本件プロジェクト方式技術協力が開始された。

5．協力概況

		計画	終了時実績	特記事項（予算追加他）
1）事業実績	日本側全経費	（具体的な計画無し）	311.5千ドル	
	相手国側全経費		2,973.6千ドル	
	専門家派遣		延べ33人	プロジェクト終了までにさらに10名受け入れ予定
	カウンターパート配置		延べ56人	
	来日研修員		延べ26人	プロジェクト終了までにさらに3名受け入れ予定
	機材供与		167,079千円	
2）開発調査	開発調査	報告書提出（19．）		
関連協力事業	単独機材供与	19．．	百万円	
	単発専門家派遣	19．．～19．．	人 M／M	
	研修員	19．．～19．．	人 M／M	
	JOCV	19．．～19．．	人 M／M	
	無償資金協力	19．．．	E／N署名 億円	
	有償資金協力	19．．．	L／A署名 億円	
3）他の供与国・国際機関による関連協力		世界銀行等の融資により、二化性養蚕関係施設、機材の整備が行われている。		

6．プロジェクトの目的及び終了時達成状況

目的	終了時達成状況
インドの環境下に於いて、二化性生糸の質と生産量を改善するために必要な実用的技術を開発し、もってインドの国家経済と農村開発に於いて重要な役割を果たす養蚕業の振興に寄与することを目指すものとする。 当プロジェクトから開発された技術は、国内需要を満たすための二化性生糸の生産増大に寄与することが（長期的観点から）期待される。 （協力対象分野） a）蚕育種技術の開発　b）蚕病防除技術の開発 c）蚕飼育技術の開発　d）桑育種・栽培技術の開発 e）蚕種製造技術の開発　f）製糸技術の開発	1．プロジェクトへの投入にほぼ計画どおり行われた。 2．プロジェクトの進捗状況は、順調に進捗している。 3．当初予定した目標が終了しない一部の課題が残される。本プロジェクトの次の段階である養蚕業の振興に寄与するという案件目標の達成のためには、地域適応性及び実用性を検討しさらに改善を図る必要がある。 4．C／Pは基本的な知識及び技術を習得した。 5．プロジェクト目標の達成、自立発展性を確保するためには取り組むべき課題が残されている。 6．以上の状況を考慮すると、プロジェクトの協力期間を10カ月延長し、分野を整理して残された課題に対して協力を継続することが適切と判断される。

11 終了時評価結果要約フォーマット

作成年月日：平成3年1月26日　　担当部課名：＿

対象国名＿インド　　対象案件名＿（ODA）無償、開調、研修、専門家、単独機材）インド二化生変亜技術開発計画　　評価調査実施時期＿

問題点（問題を惹起した要因）				
	段階1：発　意	段階2：事先（要望調査から事前調査前まで）	段階3：実行計画（事前調査から実施前まで）	段階4：実施（専門家派遣開始時から延長、フォローアップ）	段階5：その他
要因：人	[ ] 組織 ( ) ニーズ・優先度の把握が不充分	[ ] 組織 ( ) 外的条件の未確認 □政治情勢の把握が不充分 □社会構造の認識不足 □文化・教育事情の把握が不充分 ( ) 先方の協力要望内容とわが国協力実施体制との不適合	[ ] 組織 ( ) 実施計画が不充分 □詳細を詰めず見切り発車した（情報期間が不充分） □目標の設定・方針が欠如 □計画が過大である □専門家等の派遣時期の設定が切かすぎる	[ ] 組織 ( ) 運営上の問題 □専門家等の派遣遅延 □役務提供国の協力に欠している □チームワーク・コミュニケーションの不足 ( ) 案件の目標がその都度アドホックに変わり、実施体制に持続性がない	[ ] 組織
物	[ ] 施設	[ ] 施設 ( ) 現有施設の状況の未確認 □環境への配慮が不充分	[ ] 施設 ( ) 現地事情の把握が不充分 □設置場所が不適切 □電力・給水事情等への対応が不充分 □設計規模が過小	[ ] 施設 ( ) 施工の際に生じた問題 □建物設備の工事ミス・不備 □施設の遅延	[ ] 施設
方	[ ] 機材	[ ] 機材 ( ) 現地技術レベルの未確認 □部品の供給体制の未確認	[ ] 機材 ( ) 現地事情の把握が不充分 □電力・給水事情等への対応が不充分 □電圧等現地の規格への対応が不充分	[ ] 機材 ( ) 供与の際に生じた問題 □資機材の設置ミス・不備 □輸送の遅延 ( ) 機材の操作・保守管理の指導が不充分 □語学力不足 □理論面に偏り過ぎた指導 □メーカーによる操作指導の期間が不充分 □マニュアル、パーツリストが不充分	[ ] 機材
	[ ] 資金	[ ] 資金 ( ) 外的条件の未確認 □相手側のローカル・コスト負担能力の未確認 □プロジェクトをとりまく経済的環境の見通しが不充分	[ ] 資金 ( ) 投入額・投入時期の設定が不適切	[ ] 資金	[ ] 資金
相手方	[ ] 組織 ( ) ニーズ・優先度について援助側・被援助側の認識が相違 ( ) 被援助側のニーズ・優先度に対する確認の欠如 ( ) 案件・立案形成能力の欠如	[ ] 組織 ( ) 外的条件の確認 □基礎的データが不充分	[ ] 組織 ( ) 受け皿として機能すべき実施機関が明確になっていない □実施機関としての充分な権限・体制を具備していない □人材確保（カウンターパート等）の配置の見通しが不充分 ( ) 被援助側の履行すべき内容が明示されてない	[ ] 組織 ( ) 運営能力の脆弱さ □内部のコミュニケーションに難がある □上部組織の支援不足 ( ) 人的問題による □カウンターパートの能力不足 □カウンターパートの定着率が低い □カウンターパートの配置遅延・人材不足 □カウンターパート相互の連携が悪い	[ ] 組織 ( ) 政権変更によるプロジェクトの低迷・消滅
	[ ] 施設	[ ] 施設 ( ) 国内事情の誤認 □現有施設の状況把握が不充分	[ ] 施設 ( ) 国内事情の把握が不充分 □施設の設置計画が杜撰	[ ] 施設 ( ) 施設管理・維持能力の脆弱さ □プロジェクトサイトの確保及びインフラ整備が遅延 □管理の概念が不足	[ ] 施設 ( ) 騒乱・政変による破壊 ( ) 自然災害による損壊 ( ) 老朽・損耗・旧型化
	[ ] 機材	[ ] 機材 ( ) 国内事情の誤認 □機材の選定能力、選定システムが不充分	[ ] 機材 ( ) 国内事情の把握が不充分 □機材の導入計画が杜撰	[ ] 機材 ( ) 引き取りの際に生じた問題 □機材の引き取りに手間取る（通関の遅れ） □機材の破損・紛失 ( ) 技術力・保守能力の不足 □習熟度に欠ける □保守管理体制が不充分 ( ) スペアパーツ・消耗品の補給システムが確立していない	[ ] 機材 ( ) 騒乱・政変による破壊 ( ) 自然災害による損壊 ( ) 老朽・損耗・旧型化
	[ ] 資金	[ ] 資金 ( ) 財源確保の見通しの誤認 □経済見通しの誤認	[ ] 資金 ( ) 被援助側の履行すべき内容が明示されてない ( ) ローカル・コスト確保の見通しが不充分	[ ] 資金 ( ) ローカル・コストの不足 □計画倒れとなっている	[ ] 資金 ( ) 経済事情の悪化 □財政事情の悪化

尚、上記の要因の他、追加事項があれば各欄の余白部分に記入のこと。

作成年月日：平成7年7月20日　　担当部課名：＿

対象国名＿インド　　対象案件名＿（プロジェ）無償、開調、研修、専門家、単独機材）インド二化性蚕蚕技術開発計画　　評価調査実施時期＿

効果発現に貢献した要因				
段階1：発　想	段階2：事前（要望調査から事前調査前まで）	段階3：実行計画（事前調査から実施前まで）	段階4：実施(専門家派遣開始時から延長、フォローアップ)	段階5：その他
先方：当方 [ ] 組織 （ ）ニーズ・優先度の把握が的確	[ ] 組織 （ ）外的条件の確認が的確 □先方実施体制の確認が的確 □政治情勢の把握が充分 □文化・教育事情の把握が充分	[ ] 組織 （ ）実施計画が十全 □専門家の派遣方法が効果的（適材適所） □組織体制と人的配置が効果的 □ヒトとモノのバランスが取れていた （ ）運営にかかわるノウハウが技術移転計画の中に一貫して盛り込まれていた	[ ] 組織 （ ）運営が適正 □組織強化が実現 ☒相手側と積極的に意志疎通を図り問題解決に努めた ☒適正な運営を確保するため、効果的に調査団（巡回指導、中間評価等）を派遣した □担当課・在外事務所の支援が適切	[ ] 組織
[ ] 施設	[ ] 施設 （ ）現地事情の把握・判定が的確 □環境への配慮が充分	[ ] 施設 （ ）施設の選定・投入計画が適切	[ ] 施設 （ ）施工が的確 □無償資金協力によるフォローが適切	[ ] 施設
[ ] 機材	[ ] 機材 （ ）現地事情の把握・判定が的確	[ ] 機材 （ ）機材の選定・投入計画が適切	[ ] 機材 （ ）機材の供与時期・量が適切（機） （ ）操作・保守管理のための技術移転が的確	[ ] 機材
[ ] 資金	[ ] 資金	[ ] 資金 （ ）投入量・投入時期の設定が適切	[ ] 資金 （ ）ローカル・コストを負担した	[ ] 資金
先方：相手 [ ] 組織 （ ）ニーズ・優先度について援助側・被援助側の認識が一致 ☒当該分野の開発に対する意欲が高い □自助努力が強い	[ ] 組織 （ ）外的条件の確認が的確 □日本の協力の得意分野を充分に理解していた □日本側の援助スキームに対する理解していた	[ ] 組織 （ ）人材確保（カウンターパート等の配置）の見通しが十全 （ ）組織改組・強化計画が実行計画の中に盛り込まれていた	[ ] 組織 （ ）組織・体制の整備強化が実現 （ ）運営能力の向上 □本邦研修により運営への理解が深まった ☒計画に沿った投入が行えた □目標の軌道修正を行った （ ）増員・人材の定着 ☒カウンターパートの定着率が高い ☒カウンターパートの努力による技術移転進展	[ ] 組織 （ ）案件の実施に好都合な政策が導入された
[ ] 施設	[ ] 施設 （ ）国内事情の把握が的確 □現有施設の状況把握が充分 □施設の選定能力、選定のシステムが充分	[ ] 施設 （ ）国内事情の把握が十全 □良質な水・電力等を確保できた □施設の設置計画が充分	[ ] 施設 （ ）良好な管理・維持体制 （X）必要な増設・建て替えを行った	[ ] 施設
[ ] 機材	[ ] 機材 （ ）国内事情の把握が的確 □現有機材の状況把握が充分 □機材の選定能力、選定のシステムが充分	[ ] 機材 （ ）国内事情の把握が充分 □引き取り・設置の計画が適切	[ ] 機材 （ ）良好な管理・維持体制 （ ）必要な追加・更新を行った （ ）必要なスペアパーツ・消耗品を確保	[ ] 機材
[ ] 資金	[ ] 資金	[ ] 資金 （ ）ローカル・コスト確保の見通しが不充分	[X] 資金 （X）予算を充分確保した	[ ] 資金 （ ）経済事情の好転

尚、上記の要因の他、追加事項があれば各欄の余白部分に記入のこと。

12　プロジェクト・デザイン・マトリックス（ＰＤＭ）

記入年月日：１９９５年１２月８日

プロジェクト名：インド二化性養蚕技術開発計画
協力期間：１９９１年６月１日～１９９６年５月３１日
本部担当事業部・課：農業開発協力部畜産技術協力課

Narrative Summary プロジェクトの要約	Verifiable Indicatiors 指　標	Means of Verification 指標データ入手手段	Important Assumptions 外部条件
Overall Goal 上位目標 インドの国家経済と農村開発に於いて重要な役割を果たす養蚕業の振興に寄与する。	蚕糸省資料 各種統計類		・生糸の需要が低迷しない ・生糸の国際価格が低迷しない ・異常気象が継続しない ・蚕病が蔓延しない
Project Purpose プロジェクト目標 国内需要を満たすための二化性生糸の生産増大に寄与する。	蚕糸省資料 各種統計類		・民間の製糸業者が育つ ・生糸の国際価格が低迷しない ・異常気象が継続しない ・蚕病が蔓延しない
Outputs 成果 インドの環境下に於いて、二化性生糸の質と生産量を改善するために必要な実用的技術が開発される。 1．最適な育種法が開発されるとともに蚕品種が選出される。 2．ウイルス病診断方法が開発されるとともに、養蚕農家におけるウイルス病防除の指導書、微粒子虫病の防除のための指導書が作成される。 3．適切な飼育法が開発され、マニュアルに取りまとめられる。 4．種蚕、壮蚕用桑培技術が開発され標準技術指導書が策定される 種蚕、壮蚕用桑培技術が開発され標準技術指導書が策定される 5．蚕種保護技術、原蚕飼育技術、蚕種製造所における微粒子病防除法、蚕種大量製造技術が開発され、技術指針が編集される。 6．繭質評価・乾繭及び貯蔵法、繰糸技術、生糸検査技術が開発され、指導マニュアルが作成される。	詳細実施計画	・調査団による調査 ・専門家・カウンターパートによる自己評価 ・マニュアル等の成果品	・国と州の連携による養蚕振興計画が策定される ・蚕品種の指定制度、母蛾検査制度、蔟検定制度、生糸検査制度、繭（生糸）取引制度が整備される ・養蚕普及体制が整備・拡充される ・蚕糸専門教育・研究機関が整備される ・蚕糸関係機関に対する財政的支援措置がとられる ・蚕糸関係各種資材の供給体制が整備される ・蚕糸関係者の組織化の支援が行われる
Activities 活動 1．蚕育種技術の開発 2．蚕病防除技術の開発 3．蚕飼育技術の開発 4．桑育種・栽培技術開発 5．蚕種製造技術の開発 6．製糸技術の開発	Inputs投入 （日本側） チームリーダー 業務調整 長期専門家（蚕育種、蚕病防除、育蚕、桑育種・栽培、蚕種製造） 短期専門家 供与機材 （インド側） プロジェクトマネージャー コーディネーター カウンターパート 技術者、管理要員 土地、施設(CSR&TI, SSTL, CSTRI)		Pre-conditions 前提条件