

## Chapter 3 Surat Thani Pilot Project

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### Background of the Pilot Project

Parawood plantations are extensively operated for rubber production in a large area from southern Thailand to the Malaysian peninsula. In particular, Thailand accounts for 20.8% of the world rubber plantation area. In rubber plantations, parawood trees are cut at an age of around 25 years as their rubber yield decreases significantly in an age range of 25 – 30 years. They are then transported to nearby saw mills to produce timbers and boards, which are preserved, dried and often shipped without further woodworking. As for application, an increasing percentage of parawood lumbers are exported for furniture production.

In Surat Thani, rubber plantations cover 2.19 million rai of land (1 rai = 1,600m<sup>2</sup>), which account for 17.7% of the country's total, largest among other provinces. The parawood-related industry in the province consists of 63 saw mills of varying size, 14 furniture and building materials manufacturers that process parawood lumbers, and 2 particle board factories, according to a survey in June 2004.

Major issues facing the parawood industry in Surat Thani are summarized as follows.

- 1) Woodworking and furniture industries in the province generally produce low value-added products.
- 2) Most of saw mills produce a large amount of material loss in the sawing and drying processes. As a product yield is said to fall below 20%, the situation is far from an effective use of forest resources.
- 3) Many saw mills find it difficult to expand their business into downstream due to the lack of woodworking techniques (shortage of skilled workers), the lack of design capability, product knowledge and market/marketing expertise.
- 4) As the parawood industry represents an ideal form of recycling business as it utilizes parawood trees that have been used up for rubber production, it has a great potential to serve the world market in consideration of the rising concern about protection of the global environment. At the same time, however, parawood that is regarded as a waste wood is not perceived as a high quality wood material, preventing the industry from growth to a high value-added industry.

### **3.1 (Surat Thani) Outline of the Pilot Project**

#### **3.1.1 Project purpose**

(See Table 3.1-1 "Project Purpose" of PDM)

The major purpose of this pilot project is to nurture the parawood industry cluster by strengthening existing industries in Surat Thani, including saw mills, woodworking shops and furniture factories, through the transfer of latest technologies and techniques to increase value added in their operations. For the upstream sector, this can be accomplished by reducing loss of materials in the sawing and drying processes and for the downstream sector, by introducing advanced techniques relating to furniture production.

#### **3.1.2 Benefits expected**

(See Table 3.1-1 "Output" of PDM)

- (1) A private coordination body is set up for managing the pilot project and/or cluster activation.
- (2) Factories of the parawood working industry in Surat Thani make prototype furniture using designs given by the JICA mission.
- (3) Factories in Surat Thani are investigated in view of waste reduction and loss minimization of lumbering processes.
- (4) An exhibition is held for parawood furniture and other parawood products made in Surat Thani.

#### **3.1.3 Project activities**

(See Table 3.3-1 "Activities" of PDM)

- 1-1 Launch a preparatory committee for the coordination body establishment.
- 1-2 Incorporate the coordination body into the pilot project as a coordination body.
- 2-1 Recruit and select participants in the skill training and competition program for furniture making.
- 2-2 Conduct orientation, a class room and material supply for the participants.
- 2-3 Give furniture designs and guide manufacturing skills of furniture to the participants by visiting factories.
- 3-2 Determine researching methodology and analyze production losses in sawing and drying processes of participant factories.
- 3-3 Announce the results of the experiments to public and prepare a report for waste reduction.

**Table 3.1-1 Project Design Matrix (PDM) - SURAT THANI Parawood Working Industry**

**Name of Pilot Project:** Increasing of value-added of the parawood industry (up-stream and down-stream)  
**Target Group:** SMEs in Suratthani (saw mills, parawood working factories, furniture companies, etc.)  
**BDS Facilitator/Provider:** IPC 10, Surat Thani Institute for Skill Development Region 11, Walailak University  
**Period of the Project:** August 2004 - February 2005

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumption
<b>Overall Goal</b> Innovating thrust is strengthened in Suratthani parawood industry.	* As of 2010, 60% or more of the total parawood industry in Surat Thani is associated for the cluster promotion.	* Interview survey to IPC10 and a coordination body which will be established.	
<b>Project Purpose</b> Value-added of the parawood industry (including up-stream and down-stream) increases in Suratthani.	1. An exhibition is opened every year by private initiative. 2. Survey on loss reduction in lumbering processes continues for three years increasing cooperative factories to 10 at minimum.	1. Interview survey on participated factories. 2. Interview to Walailak University.	* Cluster activation movement spreads over the parawood industry in Surat Thani.
<b>Output</b> 1. A private coordination body is set up for managing the pilot project and/or cluster activation. 2. Factories of the parawood working industry in Surat Thani make prototype furniture using designs given by the JICA mission. 3. Factories in Surat Thani are investigated in view of waste reduction and loss minimization of lumbering processes. 4. An exhibition is held for parawood furniture and other parawood products made in Surat Thani.	1. Existence of a coordination body 2. 20 prototype furniture made by 6 factories or groups (at minimum) 3. A report on research and diagnosis of five or more factories for loss reduction 4. An exhibition of the prototype furniture and other parawood products	1. Local survey 2. Records of the exhibition 3. Confirmation of submission of a report to DIP 4. Record of the exhibition including photographs	* No big change happens in raw material supply in terms of quantity and prices. * The pilot project continues with increasing number of participant.
<b>Activities</b> 1-1 Launch a preparatory committee for the coordination body establishment. 1-2 Incorporate the coordination body into the pilot project as a coordination body.  2-1 Recruit and select participants in the skill training and competition program for furniture making. 2-2 Conduct orientation, a class room and material supply for the participants. 2-3 Give furniture designs and guide manufacturing skills of furniture to the participants by visiting factories.  3-1 Establish a workshop jointing a university and factories for the loss reduction project. 3-2 Determine researching methodology and analyze production losses in sawing and drying processes of participant factories. 3-3 Announce the results of the experiments to public and prepare a report on waste reduction.  4-1 Advertise the woodworking skill competitions and exhibition providing catalogue, poster and PR to mass media. 4-2 Exhibit prototypes made through 2.1 to 2.3 above. 4-3 Invite additional participants to the exhibition and display their products together.	<b>Input</b> <u>The JICA mission</u> * Japanese Experts: Two Japanese experts in temporary assignment for their field work period * Thai coordinator: One Thai coordinator who has experiences in furniture-making in a term assignment over the project period * Thai designers: Five Thai designers in temporary assignment only during the field works of Japanese experts. * Thai secretary: One Thai secretary in a term assignment over the project period * Thai interpreter: One Thai-Japanese interpreter in temporary assignment only during the field works of Japanese experts. * Operating expenses: - Employment costs of the above Thai persons - Transportation and accommodation for the Japanese experts and Thai persons - Expenses of seminars, meetings, workshops, etc. - Costs of material supply for the skill training  <u>Thai counterparts</u> * Counter personnel (DIP including IPCs) * Office space, office equipment and stationeries * Operating expenses: - Administrative and management costs of the pilot project - Transportation and accommodation for business trips to Suratthani - The training facilities for furniture-making of Suratthani Institute for Skill Development Region 11 - Expenses of seminars, meetings, workshops, etc.	* Training facilities for woodworking of Suratthani Institute for Skill Development Region 11 is available as planned.  * A joint work between a university and factories well functions.	<b>Pre-conditions</b>  * A working group is organized in the area.  * Participants join the pilot project in adequate number.

3-1 Establish a workshop jointing a university and factories for the loss reduction project.

- 4-1 Advertise the woodworking skill competitions and exhibition providing catalogue, poster and PR to mass media.
- 4-2 Exhibit prototypes made through 2.1 to 2.3 above.
- 4-3 Invite additional participants to the exhibition and display their products together.

### **3.1.4 Overall schedule**

Figure 3.1-1 shows on executing schedule of the pilot project in Surat Thani.

### **3.1.5 Major activities in each field survey**

The pilot project was carried out for about six and half months from the third field survey starting on 15 August 2004 to the sixth field survey ending on 26 February 2005.

#### **3.1.5.1 3rd field survey: 15 August -11 September (28 days)**

- (1) Opening of a two-day seminar (with one-night stay) for structuring a cluster of regional stakeholders and for raising the awareness of "cluster" and "pilot project" from 21 August to 22 August - around 60 participants
- (2) Introductory visits to candidate BDS providers etc. (Refer to Attachment 3-1 attached at the end of this chapter for BDS provider list.)
  - 1) Surat Thani Institute for Skill Development Region 11 (SISD 11)
  - 2) FTI Surat Thani Chapter
  - 3) TCC Surat Thani Chapter
  - 4) Walailak University
  - 5) Surat Thani Campus of Prince of Songkla University
  - 6) Surat Thani Rajabhat University
  - 7) Office of the Rubber Replanting AID Fund (ORRAF)
  - 8) Board of Investment Surat Thani (BOI)
  - 9) Thai Parawood Association (TPA)
  - 10) SME Bank Surat Thani
  - 11) SICGC Surat Thani

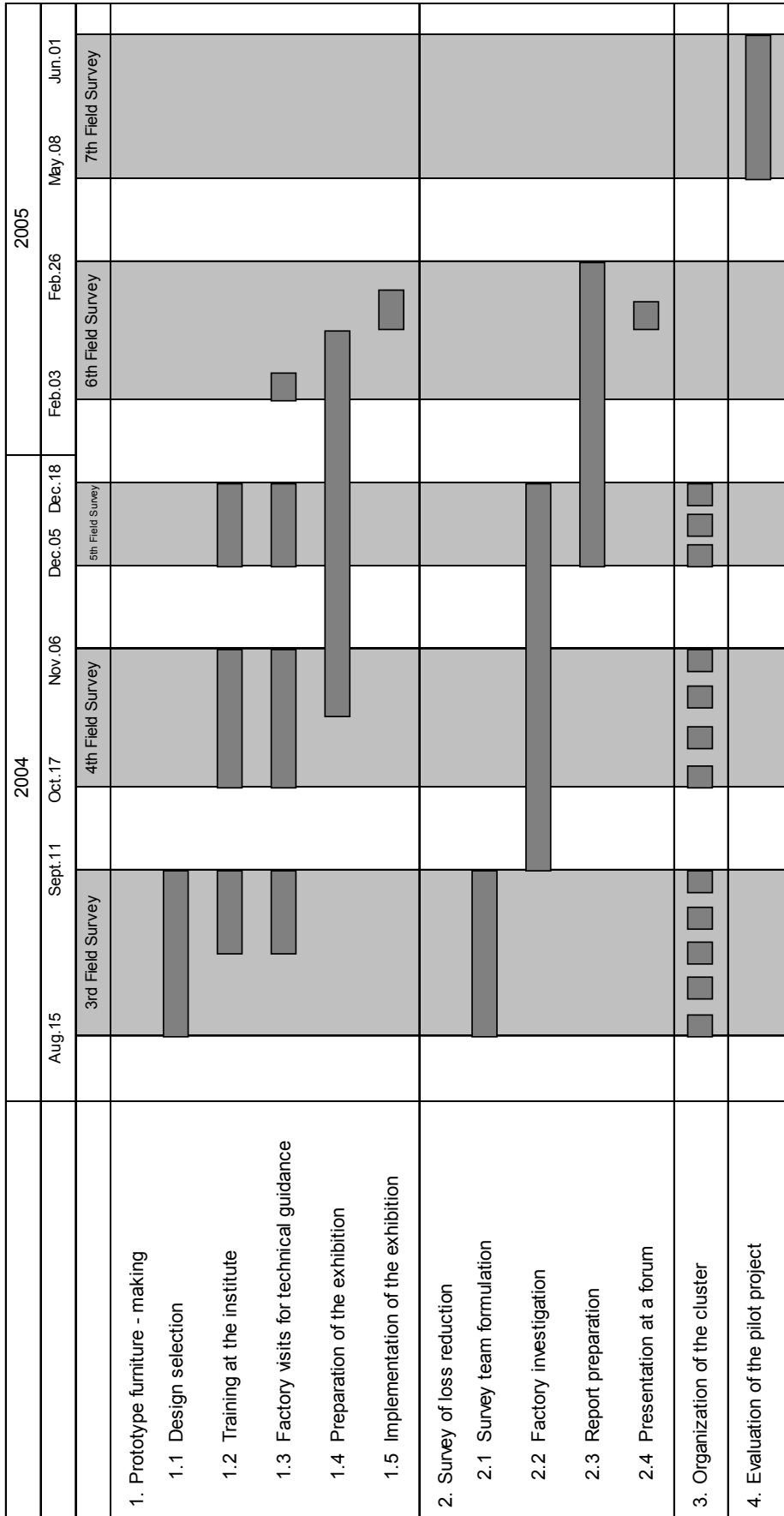


Figure 3.1-1 Implementation Schedule

- (3) Factory visits for recruiting participants of the pilot project
  - 1) More than 10 factories
- (4) First meeting with the Surat Thani provincial governor and the vice governor for introduction of CSCD, 7 September 2004
- (5) Meeting chaired by the JICA mission for the loss reduction study with attendance of key researchers of Walailak University, five factories and IPC 10

#### **3.1.5.2 4th field survey: 17 October – 6 November (21 days)**

- (1) Clinic services for furniture-making technology
- (2) Agreement with SISD 11 on training of new comers to furniture making
- (3) Commencement of research and study on loss reduction at factories
- (4) Second meeting with the vice governor concerning the progress of the pilot project

#### **3.1.5.3 5th field survey: 5 December – 18 December (14 days)**

- (1) Continuation of the clinic services for furniture-making technology
- (2) Continuation of the new comers training in SISD 11 on furniture making
- (3) Preparatory works for the exhibition to be held during the ensuing field survey
- (4) Third meeting with the vice governor on the exhibition
- (5) Interim presentation by the researchers on the loss reduction study

#### **3.1.5.4 6th field survey: 3 February – 26 February (24 days)**

- (1) Press conference at the provincial office on 7 February 2005 with about 60 attendants
- (2) Preparatory work for the exhibition including reception of 17 Japanese visitors
- (3) Opening exhibition from 18 February 2005 to 21 February 2005 including a forum of 19 February 2005
- (4) Arrangement of plant visits and business talks for Japanese buyers

## **3.2 Performance of the Pilot Project**

### **3.2.1 (Output 1) A private coordination body is set up to manage the pilot project and/or cluster activation.**

#### **3.2.1.1 Formulating a founding committee for cluster organization**

A founding committee for Parawood Industry Cluster - Surat Thani Design Center (PiC-SDC), tentatively name, was established during the two-day seminar of 21 and 22 August 2004 with the following appointments (See Attachment 3-2 at the chapter end for proposed concept of PiC-SDC.):

- Chairman: Mr. Supachai of Ecofurn
- Vice-chairman: Mr. Funsak of Mean Mile
- Vice-chairman: Mr. Sanong of VS Surat Parawood
- Committee: Mr. Prathips of Surat Thani Institute for Skill Development Region 11
- Committee: Mr. On Anon of Indharoj

The club called PiC-SDC did not function well mainly because its members were No.2 or below in their companies with the difficulty in showing leadership, together with limitation of time disposable cluster activities.

#### **3.2.1.2 Re-organizing of the founding committee**

The JICA mission attempted to persuade three young presidents of influential companies to advocate formulation of PiC-SDC, while giving up the idea of persuading the former five persons. At the meeting on 15 December at IPC10, the three young presidents did not show interest in the concept of PiC-SDC. They interested in short-term activities like the exhibition but the long-term master plan although it was planned under consensus of people related to the parawood industry in the region.

#### **3.2.1.3 Consideration**

The reason why an organization of a Surat Thani parawood cluster has failed to make a significant progress as expected is that the networking of industries, academic worlds, and governments is still at a primitive stage partly because the parawood processing industry is a young industry. This output was not materialized within the time frame of the pilot project and remains as an important challenge in the future. It is expected, however, that a working group will be formulated at a provincial level to monitor



performance of the cluster activation program that is implemented using the new provincial budget allocated to the Surat Thani parawood cluster.

### **3.2.2 (Output 2) Factories of the parawood working industry in Surat Thani make prototype furniture using designs by the JICA mission.**

#### **3.2.2.1 Outline**

The training course in woodwork was divided into two courses, i.e., the beginners' course intended for newcomers to the furniture-making industry and the advanced course for engineers and skilled workers of furniture manufacturing companies. In the beginners' course, instructors of Surat Thani Institute for Skill Development Region 11 (SISD11; administrated by Ministry of Labor) gave lecture and practical training based on a 62-hour curriculum according to a JICA mission expert's advice. Participants were workers from five companies and four students of SISD11. Practically training for beginners was conducted on the basis of drawings prepared by the mission expert. As for the advanced course, a traveling clinic was held by the expert visiting three companies participated in this program.

(1) Advanced course participants

Ecofurn (M.D. Mr. Pirophong)

KCL Intertrade (G.M. Ms. Rotana)

Wattana (M.D. Mr. Wattana)

(2) Beginners' course participants

Mean Mile

BNS Wood Industry (M.D. Mr. Akarin)

Choosak Prasang Parawood (E.C. Mr. Vanich)

Choosak Union Parawood (G.M. Mr. Nattawut)

Pyramid Parawood (F.M. Mr. Phisnu)

4 students from Surat Thani Institute for Skill Development

(3) Supporting members

Saengruang Group (M.D. Mr. Aniyottho)

Southern Siam Parawood (M.D. Mr. Prasong)

Erawan Wood Product (M.D. Mr. Chztsuman)

Fancy wood Industry (F.M. Mr. Akkararin).

### 3.2.2.2 Provision of furniture designs (drawings)

This activity in Output 2 aimed to provide participants with an opportunity to learn the preparation of full-scale drawings based on basic drawings provided by JICA expert and manufacture furniture according to them.

Mr. Odawara, who is an expert of the JICA mission as well as a famous furniture designer in Japan, provided IPC 10 with about 80 furniture designs with drawings that he made for use in the pilot project. A number of prototype furniture were made by participants in both the beginners' and advanced courses using these designs, and were presented at the exhibition.

### 3.2.2.3 Training course for beginners

For newcomers in the furniture production industry including employees in saw mills, graduates and students of SISD11 and individuals, it was decided to train their employees at SISD11. The training curriculum was prepared with the training schedule (Table 3.2-1), and the training course started accordingly.

**Table 3.2-1 Training Curriculum at Vocational Training Center**

	Subject	Class room lecture hour (H)	Training hour (H)
1	Safety in workshop	0.5	
2	Mathematics relating to woodwork	0.5	
3	Use and maintenance of woodworking equipment and tools	1	4
4	Use and maintenance of woodworking machinery	1	5
5	Furniture design standards	1	
6	Reading and interpretation of design drawings	2	9
7	Woodworking technology	2	10
8	Chairs	2	5
9	Practice using the donated drawings	2	13
10	Cost estimation for woodworking and furniture	2	2
	Total	14	48

Participants in the beginners' course were employees of the five companies (Mean Mile, BNS Wood Industry, Choosak Prasang Parawood, Choosak Union Parawood and Pyramid Parawood) and four graduates and students of SISD11.

On 3 September 2004, an opening ceremony for the furniture and woodworking workshops was held at 10:00 a.m. at IPC10 in the presence of representatives of participating enterprises, the vocational school or SISD11 and Parawood industries. They moved in the afternoon to the vocational school (Surat Thani Institute for Skill Development Region 11, SISD11) for touring the school facilities. They also met with the director of the institute to discuss future plans for fostering the woodworking industries in Surat Thani Province.

#### **3.2.2.4 Manufacture of prototype furniture**

The participants in the advanced course representing three companies, which are manufacturing and selling furniture, made prototype furniture using the donated designs for the exhibition at their factories between August 2004 and January 2005. Four beginners from SISD 11 made prototype furniture during the same period at the factory of SISD 11. Other beginners who were mostly workers of saw mills and had no experience in furniture making made prototypes at their factories or SISD 11. During the period, the JICA expert visited the factories for field technical guidance.

### **3.2.3 (Output 3) Factories in Surat Thani are investigated in view of waste reduction and loss minimization of lumbering processes.**

#### **3.2.3.1 Work flow of the loss reduction survey**

Output 3 is a result of joint research and study conducted by a university and factories under the assistance of the JICA mission. The JICA mission designed the following work procedures before organizing a research team:

- (1) To organize a task team for Output 3 representing a university and five or more cooperative factories, i.e., saw mills equipped with the drying process.
- (2) The task team makes a fact finding survey at the cooperative factories so as to identify the quantity of losses by process and major causes for the losses.
- (3) The task team scrutinizes the existing best practice in sawing and drying process in view of less loss.
- (4) The task team reports effectiveness of the technologies to the public.

### **3.2.3.2 Formation of a survey task team and the scope of work**

The JICA mission visited Walailak University first in May 2004, which is located in the neighboring two provinces - Nakhon Si Thammarat and Surat Thani - and has long experience in utilization of parawood for industrial use in the Wood Science and Engineering Unit. Dr. Buhnnum agreed to organize a task team to conduct the loss reduction survey by inviting nine researchers inside and outside of the university, together with postgraduates of the university.

On 9 September the JICA mission, Walailak group or the task team and the participating enterprises held a meeting on the scope of work for the loss reduction survey at IPC 10. Taking into account requirements of cooperative enterprises, target processes for loss reduction and improvement were determined as follows:

- a) Sawmilling of parawood logs
- b) Kiln drying of parawood lumbers
- c) Treatment for improving quality of parawood lumber (Chemical treatment of lumber)

### **3.2.3.3 Cooperative factories to join the loss reduction survey**

The JICA mission requested factories to join the survey by visiting more than 10 factories in Surat Thani. The following five companies have authorized the researcher to study their factories and publish the results:

- (1) Choosak Prasang Parawood Co., Ltd.
- (2) Ecofurn Co., Ltd.
- (3) Wattana Parawood Co., Ltd.
- (4) Pyramid Parawood Co., Ltd.
- (5) VS Surat Parawood Limited Partnership

The Taiwan based largest furniture-making company in the region, Fancy Parawood Industry, provided the researchers, at the initial stage of the survey, with its daily operation data and useful suggestions for the methodology of the survey as one of supporting members for CSCD.

### **3.2.3.4 Reports of the loss reduction survey**

In sawing process, the survey task team measured actual state of differences in yields and quality

depending on the state of teeth of saw, use of bogie, combination of sawing machines, etc. to examine and conceive possible loss reduction measures.

In the drying process, the survey task team measured dimensions of a drying room, the number of fans installed in the room, the number of motors, the state of heating coils, wind velocity/volume, temperature, humidity, drying time, kinds of dried wood, control method, etc. to develop measures for loss minimization of wood and energy.

In the impregnation process (chemical treatment process), the survey task team examined kinds of chemicals to be used, concentration of the chemicals, the state of pressurized time by plate thickness, the state of residual chemicals, effect of chemical treatment, etc. to develop measures for securing safety.

On 14 December, the survey task team made an interim report on study results to the JICA mission, the participating enterprises and IPC 10 staffs at IPC10 office. The study was the first joint industry-academia study in the region. Interesting results were obtained to depict different conditions of the five companies in sawing, drying and chemical treatment processes. The draft final study report was submitted on 4 March 2004 with a summary report in English. The JICA mission reviewed the report and submitted it to DIP for making it available to the industry concerned.

The outline of the research and study was exhibited at the First Parawood Woodwork Technology Exhibition and it presented to 90 audiences at the forum held on 19 February 2005.

### **3.2.3.5 Effects of the loss reduction survey**

The loss reduction survey has produced the following effects:

- (1) The Surat Thani province appropriated a one-year budget of Bt 440,000 for the continuation of the survey conducted during the pilot project.
- (2) Pyramid Parawood Co., Ltd. that participated in the survey has successfully improved efficiency of the drying process by 30% by incorporating high quality of lumbers as a result of the survey.
- (3) Although Chinese buyers stopped importation of low-grade lumbers including products in Surat Thani, the survey already indicated countermeasures in its report.
- (4) Saw mills in other provinces have offered to Walailak University to join the loss reduction survey as partners from industry.

### **3.2.4 (Output 4) An exhibition is held for parawood furniture and other parawood products made in Surat Thani.**

#### **3.2.4.1 Press conference on 7 February 2005**

The JICA mission made a formal announcement on the exhibition to media at the conference room of provincial office on 7 February. About 60 persons including journalists, universities and parawood industry attended the press conference where prototype furniture was exhibited as products made by participants in the beginners' course at SISD11. Intensive work schedule, including distribution of posters and direct mails, preparation for reception of Japanese visitors, check of contents of exhibition and change of layout, was overcome.

#### **3.2.4.2 Opening of the First Parawood Woodwork Technology Exhibition**

As the closing of PP in order not only to let the region and marketplace know the outputs widely but also to introduce the whole woodwork industry in Surat Thani by bringing currently available parawood products in Surat Thani to one place, the First Parawood Woodwork Technology Exhibition was held as follows:

- (1) Period: 18 - 21 February 2005
- (2) Location: Exhibition hall of IPC10 (667.5 m<sup>2</sup> for 1st and 2nd floors)
- (3) Generation configuration of the exhibition
  - 1) History of rubber industry
  - 2) Present situation of parawood industry and dream of industry
  - 3) HRD organizations (SISD 11, Surat Thani Campus of Prince of Songkla University, Rajabhat University, Walailak University)
  - 4) Demonstration of handcraft (Batik, hand knitting goods)
  - 5) Product displays by companies
  - 6) Reference displays
- (4) Exhibitors, companies and organizations
  - 1) Exhibitors:  
BNS, Ecofurn, KCL, Wattana, SISD 11, F&C/DIP (BNS and SISD 11 were new entrants in the furniture industry)

2) Own woodwork products:

BNS, Ecofurn, KCL, Wattana, Ruang Utai, Fancy, Sun Paratech, Prison

### 3.2.4.3 Major events at the exhibition

(1) Opening ceremony and panel discussion on 18 February 2005

The opening ceremony was held by inviting Mr. Pramode Vidtayasuk, Director of DIP, and Ms. Pattanan Sonboonpong, Vice Governor of Surat Thani province. The opening ceremony was attended by over 100 people.

(2) Forum on 18 February 2005

(In the morning)

- “Presentation of study results on loss reduction in the processes of sawing, drying and impregnation treatment”, by Dr. Buhnnum, an expert of parawood engineering who involved in PP
- Lecture about the situation of the industry, by representative management in Thai sawing factories

(In the afternoon)

- Panel discussion on “Direction and opportunity of the parawood industry in the international market”

Mr. Mitsuru Kato, President of Universal Home, gave a special lecture entitled “Present situation of Japanese housing industry” at the beginning of the forum. He visited Surat Thani to observe the First Parawood Woodwork Technology Exhibition. 91 attendants, the number far exceeding the expectation, joined the forum and presentation for long hours from 9:00 to 16:30. Many local students were among attendants including people from the parawood industry, which suggests a growing interest in the local industry, especially young people.

#### 3.2.4.4 Number of visitors to the exhibition

##### (1) Thai people

It was originally planned to limit access of visitors to the front entrance. Actually, however, another entrance/exit with the direct access to the hall was open. As a result, there were presumably a large number of visitors who did not receive the questionnaire. Meanwhile, about one half of visitors entering from the front entrance were estimated to receive the questionnaire, totaling 436. Therefore the estimated number of visitors was double that of the questionnaires actually distributed.

##### (2) Japanese delegation

What is emphasized is that as many as 17 representatives of 12 enterprises came from Japan just to visit the exhibition (Table 3.2-2). The Director General of DIP not only attended the opening ceremony but also sponsored the welcome party for the delegation. He expressed a strong intention to promote the parawood industry. The Japanese delegation observed the exhibition and visited companies including exhibitors to observe the workshops and exchange talks with their management, contributing greatly to the establishment of communication and acquaintance between the Japanese and Thai companies at the management level. It is expected that these activities would lead to the creation and expansion of business relations in the future.

#### 3.2.4.5 Results of the questionnaire survey covering visitors

##### (1) Distribution and collection

Date	No. distributed	No. collected	Collection rate (%)
18 February	185	61	33.0
19 February	80	60	75.0
20 February	78	70	89.7
21 February	93	59	63.4
Total	436	250	57.3



## (2) Professions of respondents

Job	Composition (%)
Buyer	12.0
Designer	0.4
Sawing sector	6.8
Building material/furniture mfg. sector	9.2
Government employee	24.4
Teachers of universities etc.	4.8
Students of University and master courses	15.6
Others	21.6
No reply	5.2
Total	100.0

**Table 3.2-2 List of Japanese Delegation**

No.	NAME	Company Name	Title	Business	Address	Phone No.	Fax No.	E-Mail
1	YOKOI Koichi Mr.	Uchida Techno Co., Ltd.	Executive Director	Office interior	25-3, Nishi-Ogu 4-chome, Arakawa-ku, Tokyo 116-0011 Japan	03-3894-2311	03-3894-4333	yokoi@ulecs.co.jp
2	TOKUNARI Yuji Mr.	Uchida Techno Co., Ltd.	Director of Product Development Dep.	Office interior	25-3, Nishi-Ogu 4-chome, Arakawa-ku, Tokyo 116-0011 Japan	03-3894-2311	03-3894-4333	tokunari@ulecs.co.jp
3	KATO Mitsuru Mr.	Univ ersal Home, Inc.	President & CEO	Housing suppliers	11-11, Shiba 1-chome, Minato-ku, Tokyo 105-0014 Japan	03-6400-3154 (Mr. Ny unoya)	03-6400-3158	kato@ho.univ ersalhome.co.jp
4	YOKOYAMA Shinji Mr.	Univ ersal Home, Inc.	Managing Director	Housing suppliers	11-11, Shiba 1-chome, Minato-ku, Tokyo 105-0014 Japan	03-6400-3154 (Mr. Ny unoya)	03-6400-3158	yokoyama@ho.univ ersalhome.co.jp
5	MIYAGAWA Hideo Mr.	Chusin Ltd.	Chairman	Manufacture and sales of wooden furniture	1835, Meisei, Misato-mura, Minami-Azumi-gun, Nagano 399-8101 Japan	0263-77-2700	0263-77-6448	chushin@po.nccci.or.jp
6	NAKANO Hideharu Mr.	Japan Moulding Ltd.	President	Import of housing materials	9-1117, Higashi-Nopporo-cho 1-chome, Ebetsu City, Hokkaido 069-0821 Japan	011-381-9151	011-381-9154	nakanano@ag4.mopera.ne.jp
7	OGASAWARA Masatoyo Mr.	Masatoyo Ogasawara Architect Ltd.	Representative	Architectural design	2-1-13-302 Takada, Toshima-ku, Tokyo 171-0033 Japan	03-5954-2331	03-5954-2331	ogasawara@masatoyo.com
8	IKEDA Haruo Mr.	Kanematsu Takumi Consultants	Representative	Interior coordinator, Sales promotion producer	6-12-402, Ebara 3-chome, Shinagawa-ku, Tokyo 142-0063 Japan	03-3787-6241	03-3787-6241	h-ikeda@giga.ocn.ne.jp
9	IKEDA Kesayo Ms.	Kanematsu Takumi Consultants	*	Interior coordinator, Sales promotion producer	6-12-402, Ebara 3-chome, Shinagawa-ku, Tokyo 142-0063 Japan	03-3787-6241	03-3787-6241	h-ikeda@giga.ocn.ne.jp
10	FUKUDA Hiroshi Mr.	Forest Life Common Facility Coop	Secretary-General	Woodworking	1F, Daiou Bldg., 1-4, Zaimoku-cho 1-chome, Ueda City, Nagano 386-0014 Japan	0268-29-3001	0268-29-3133	
11	MINOSHIMA Ryoichi Mr.	Kokutu Woodworking	*	Woodworking	1377-9, Kokufu-Hongo, Oiso-machi, Naka-gun, Kanagawa 259-0111 Japan	0463-61-4173	0463-61-9163	k-lategu@gamma.ocn.ne.jp
12	YAGI Osamu Mr.	Kazariichi Corporation	Director of Laboratory	Chemical for woodwork	7-2, Tsurumi-Chuo 5-chome, Tsurumi-ku, Yokohama City, Kanagawa 230-0051 Japan	045-501-1001	045-501-3996	o.yagi@kazariichi.com
13	SHIMADA Naomasa Mr.	Ueda Daisan Mokuzai G.K.	Chairman	Oversea and domestic wood product seller	201-5, Kazawa, Touni City, Nagano 389-0514 Japan	0268-62-1202	0268-62-1203	shimada@dai3wood.co.jp
14	SAWAGUCHI Ryutaro Mr.	S-Tech Wood	President	Wooden bath-tab manufacturer	31-1, Aza-Shimomiya-Hakusan, Iketsuki, Iwadeyama-machi, Tamatsukuri-gun, Miyagi 989-6405 Japan	0229-78-2211	0229-78-2332	
15	SAWAGUCHI Fukuko Ms.	S-Tech Wood		Wooden bath-tab manufacturer	31-1, Aza-Shimomiya-Hakusan, Iketsuki, Iwadeyama-machi, Tamatsukuri-gun, Miyagi 989-6405 Japan	0229-78-2211	0229-78-2332	
16	KITAMOTO Konosuke Mr.	S-Tech Wood		Wooden bath-tab manufacturer	31-1, Aza-Shimomiya-Hakusan, Iketsuki, Iwadeyama-machi, Tamatsukuri-gun, Miyagi 989-6405 Japan	0229-78-2211	0229-78-2332	
17	KITAGAWA Isao Mr.	ASEAN Trading Co. Ltd.	Managing Director	Trade of housing materials and furniture	A-2105, 1-2, Akutagawa-cho, Takauki-City, 569-1123 Osaka Japan	81-72-686-1211	81-72-686-1201	aseanbc@mx2.canvas.ne.jp ikabc@mx2.canvas.ne.jp

## (3) Impressive exhibitors

Exhibitor	Composition (%)
Ecofurn	54.8
SISD 11	34.4
Fancy	28.4
KCL	18.8
Ruang Utai	18.8
F&C/DIP	17.6
BNS	16.4
Prison	14.4
Wattana	13.6
Dream Industry	36.8
History of Rubber Industry	29.6
Walailak University	24.4
Prince of Songkla University	22.0
Rajabhat University	16.8

## (4) Expectation for the periodical exhibition

Percentage of respondents expecting the periodical exhibition: 96.8%

## (5) Suggested improvements at the future exhibition

## 1) About exhibition facilities: 45 responses

Subject	No. of responses
Location is difficult to find, too far, inconvenient.	7
Preferably be held in the center of city.	6
Good	9
Suitable	8
Exhibition hall is too small.	7
Extension of opening hour	3
Others	5

Many responded that the location was good, while a significant number of persons responded that the location was difficult to find with inconvenient access.

- 2) Content of the exhibition (Need for display of parawood goods other than furniture etc.): 50 responses

Subject	No. of responses
Need for display of parawood goods other than furniture etc.	21
Only furniture, no need for other products	4
Wood products including parawood	6
On-spot sales/order of parawood products desirable	5
Number of products displayed is too small.	3
Guides and presenters are required.	2
Others	9

Many respondents expressed that they would like to see products other than parawood, including interior decoration products. This seems to reflect consumers' general wants to have a comfortable living space.

- 3) Future prospect for the parawood industry (especially related to ecology): 43 responses

Subject	No. of responses
Bright future, will improve step by step	25
Environmental consideration is required.	4
Can mitigate destruction of forests	3
Promote substituted plantation	2
Others	9

Many respondents considered that the parawood industry had a good future prospect and some viewed the problem of environment as a favorable factor for the industry.

- 4) Evaluation of woodwork related technology in Surat Thani (export competitiveness)

Subject	No. of responses
Have export competitiveness	4
Have reached to the exportable level	3
Great potential for export	2
Very good, superior	4
Good, fairly good	5
Not inferior compared with others	2

Other positive responses	2
Modification of design is necessary.	3
Use of own design	2
Improvement for better goal	4
Continuous technical training is required.	1
Others (Export can be achieved with some improvement etc.)	10

A significant number of responses gave positive evaluation that the industry has already obtained export competitiveness or the exportable level. On the other hand, some pointed out that further technical improvement and promotion of improvement would be required. It can be said that continuous efforts and friendly competition are required.

5) Others: 28 responses

Subject	No. of responses
More promotion and advertisement required	8
Guides and presenters are necessary	2
Need to distribute companies' profiles including address	2
Sale of products at site	3
Periodical exhibition is called for.	3
Excellent	4
100% super	2
New entrepreneurs might be created to see the exhibition.	1
Others	3

Some companies did not show their name in the booth, did not prepare company brochures and name cards and/or did not assign company attendants to describe their products. Companies must recognize the importance of interacting with potential customers and the general public.

#### 3.2.4.6 The results of the questionnaire survey covering Japanese delegation

The delegation from Japan consisting of 17 persons representing 12 enterprises stayed in Surat Thani for one week and visited the exhibition and five parawood factories in Surat Thani.

(1) Numbers of visitors, companies and responses

- Number of visitors: 17
- Number of companies: 12
- Number of responses: 11

(2) Type of business

- Furniture production (4 companies)
- Manufacturing, Import and sales (2 companies)
- Import and sales (3 companies)
- Design and consultation (2 companies)

(3) Summary of the questionnaire survey

The JICA mission conducted a questionnaire survey to ask opinions of the Japanese companies on the Surat Thani parawood industry. Their responses are summarized below:

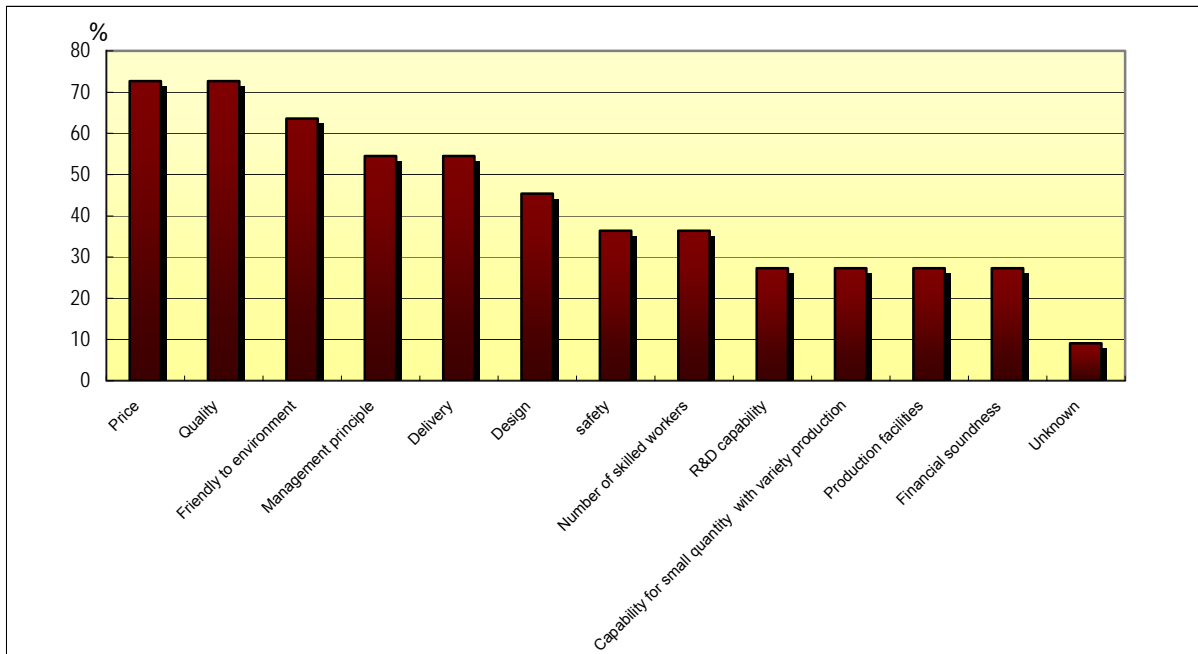
Overall Impression

- Do you feel attractiveness to parawood industry in Surat Thani? ..... Yes: 100% (11 responses)
- Is there possibility to start business talk with companies in Surat Thani? ..... Yes: 73% (8 responses)
- How often shall be the exhibition opened in Surat Thani? ..... Once a year: 73% (8 responses)
- What is your request for the next exhibition in Surat Thani? More variety of products: 82% (9 responses)

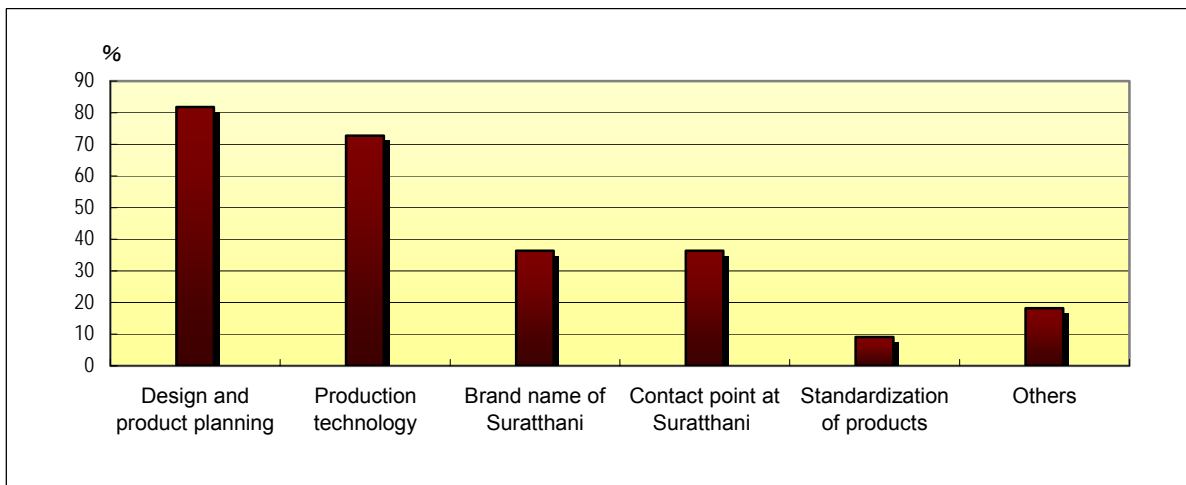
What kind of parawood products are you interested in purchasing?

- Jointed board, flooring panels: 7 companies.
- Assembled furniture: 5 companies.
- Parts for furniture: 5 companies.
- Construction materials: 2 companies.
- Sawn products: 1 company.

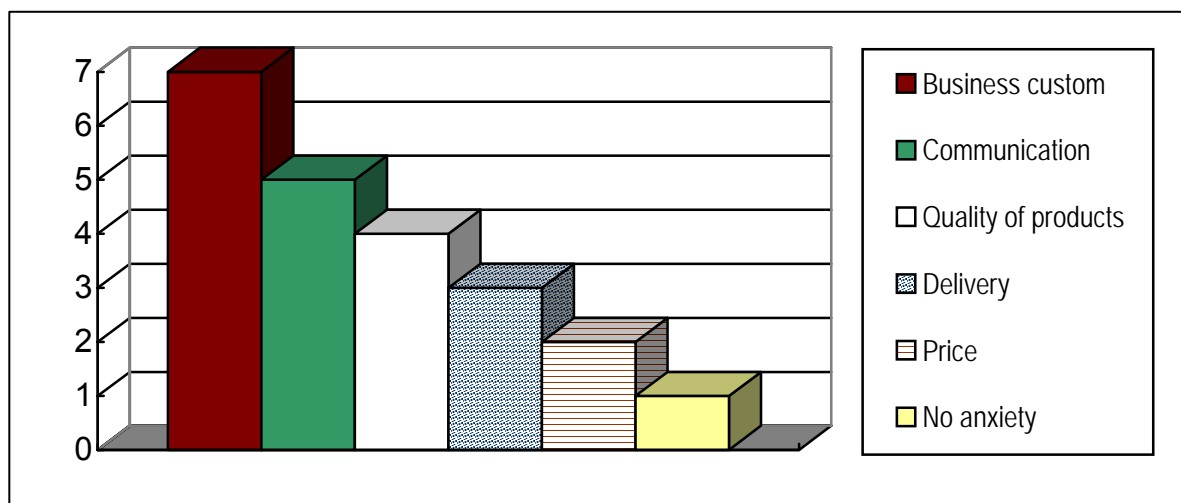
Important factors considered in selecting suppliers for long-term business



Problems to be improved by the parawood processing industry in Surat Thani.



Major concerns about having business relations with companies in Surat Thani.



### 3.3 Organizations established for the cluster

Lessons from the execution of the pilot projects suggest that a cluster should have two organizations: one at a provincial level and the other is a private enterprise or a group of SMEs. The provincial governor's office will establish and manage the provincial level organization in order to manage the master plan and the action plans. The latter private organization including a group of SMEs will be responsible for sustainable operation of the pilot project including the management of a periodical exhibition (say, annually), which is expected by a large number of visitors, i.e., 96.8 % of Thai visitors and all of Japanese guests.

Surat Thani Province has gradually increased interest in the parawood industry in accordance with the progress of the CSCD project. At the opening ceremony of the exhibition in February 2005, the vice governor announced that the province designated the parawood industry as a strategic industry of the province. Accordingly the provincial government appropriated a budget for the parawood cluster activation in amount of Bt2.89 million for the fiscal year ending September 2005. The objective of the budgetary allocation is as follows:

(Objective)

- 1) To upgrade the parawood processing industry, drive business promotion and improve its competitiveness
- 2) To formulate the parawood industry cluster in Surat Thani Province



**Table 3.3-1 Budget for the Parawood Industry Cluster in Surat Thani**

Allocation	Amount (Bahts)	Usage
IPC10	2,200,000	CF: 4 projects, TF: 100 persons, Overseas study tour (10% subsidy): one tour, Cluster formulation: 1 group
SISD-R11	250,000	Human resource development: 100 persons (Technology: 50 persons, Management: 50 persons)
Walailak University	440,000	Continuation of the loss reduction survey implemented in the pilot project

Note) CF: Consulting Fund TF: Training Fund SISD: Surat Thani Institute for Skill Development Region 11

The vice governor of the province said that a working group would be formulated at a provincial level for activation of the parawood industry cluster. In addition, on 17 May 2005, the participants in the 2nd seminar in Surat Thani discussed the organization of the cluster in the future. Table 3.3-2 shows a summary of the group discussion. Thus, the building of consensus on the establishment and promotion of the cluster is in steady progress.

**Table 3.3-2 Results of Group Discussion at the 2nd Seminar**

17th of May, 2005

Group 1	Group 2
1. Leader of exhibition next year - IPC10 - Surat Thani province - FTI Surat Thani Chapter - TCC Surat Thani Chapter - ORRAF - Thai Furniture Association - SISD11 - Financial Institutions in Surat Thani	1. Leader of exhibition next year - Sponsor: Surat Thani province, IPC10 - Supporter: ORRAF, Saw mills
2. Liaison with Japanese buyers - Export Promotion Center - Parawood Association - Thai Furniture Association - Trading companies	2. Liaison with Japanese buyers - Surat Thani Export Promotion Center
3. Responsibility for cluster activation - Initiation: IPC10 and FTI - Strengthening: Private sector	3. Responsibility for cluster activation - First step: Governments formulate a center PIO/IPC10 Leaders of saw mills, Manufactures, 5 companies participated CSCD - Second step: Enterprises formulate a center (Ex.: Fancy, Ruang Utai, Rainbow) - IPC10 supports for strengthening

### **3.4 Terminal Evaluation**

Upon completion of the pilot project, terminal evaluation was carried out as follows:

- Evaluation period: 8 May – 1 June 2005
- Survey method: Interview and questionnaire surveys of related parties and organizations in Surat Thani and Bangkok, and document research and analysis
- Data collection: Available source materials including the pilot project report, the reviewing of questionnaire survey results at the second seminar, and interview surveys
- Evaluation method: Verification of project performance, and evaluation based on the Five Evaluation Criteria
- Evaluators: Mr. Yuzo Arai and Mr. Takeshi Odawara

The objective and methodology of the evaluation are summarized in Annex attached at the end of this report.

#### **3.4.1 Plans for verification of project performance and evaluation study**

##### **3.4.1.1 Verification of project performance (plan)**

Attachment 3-3 presented at the end of this chapter shows a summary table for verification of the project implementation results (for field survey), which consists of verification of the performance and the implementation process. (See Annex at the report end for detailed explanation on the summary table.)

For verification of project performance and the implementation process, a description on evaluation of the pilot project and its methodology are given in terms of evaluation criteria and method, survey items and required data, information sources, and a data collection method.

##### **3.4.1.2 Evaluation study plan (Five Evaluation Criteria)**

Attachment 3-4 at the chapter end summarizes the Evaluation Grid for the pilot project using the Five Evaluation Criteria (relevance, effectiveness, efficiency, impact, and sustainability). (See Annex at the report end for detailed explanation on the Evaluation Grid.) For each of the Five Evaluation Criteria, a description on evaluation of the pilot project and its methodology are given in terms of evaluation criteria and method, survey items and required data, information sources, and a data collection method.

### 3.4.2 Verification of project performance

#### 3.4.2.1 Verification of project performance

See Attachment 3-3 attached at the end of this chapter.

Evaluation was made by comparing the results with planned indicators for the following four items:

- 01 Was the input conducted as planned?
- 02 Was the output conducted as planned?
- 03 Will the project purpose be achieved?
- 04 Are there prospects that the overall goal will be achieved?

As for "input" and "output," planned indicators were compared with actual values in order to assess the level of achievement. For the purpose of this evaluation, the level of achievement of 70% or more was considered to indicate that the planned target was achieved.

(1) 01 Was the input conducted as planned?

The input was successfully made in most parts according to the plan.

##### 1) Input made by the Japanese side

The input made by the Japanese side included the appointment of two Japanese experts, Thai designers, coordinators and secretary, with disbursement of costs and expenses for personnel, travel, instructors, training equipment and materials, office supplies relating to research and study, and planning and management of the exhibition.

In terms of level of achievement, the input in terms of hiring the Thai designers, coordinators and secretary was lower than planned, while the input relating to Japanese experts and cost disbursement was executed mostly according to the plan. On the overall average, the level of achievement reached 80%.

2) Input made by the Thai side

The input made by the Thai counterpart covered its personnel and traveling costs and portions of office, copying and meeting-related expenses.

The input was made generally smoothly, except for the assignment of personnel and provision of office equipment and supplies, and the level of achievement was 90%.

(2) 02 Was the output conducted as planned?

Evaluation was made for the following four outputs listed in PDM:

1) Output 1 (A private coordination body is set up to manage the pilot project and/or cluster activation.)

Evaluation based on the indicator (existence of a coordination body): At the first seminar, a preparatory committee for founding the Design Center as the pilot project implementation body was organized, consisting of five members. However, due to a limited voice and influence of the members in the industry and other constraints, cluster development activity did not made progress as expected and the center was not organized. The preparatory committee was held only once and discontinued its activity in October 2004.

Meanwhile, the pilot project has brought significant changes to the business environment facing the parawood industry. A number of companies in the industry, especially those participating in the exhibition on parawood woodworking technology and the loss reduction survey, have definitely been inspired by the first exhibition on woodworking technology and products, the visit by a Japanese delegation, tangible results of the industry-academia joint research project, and the provincial government's policy change to designate the parawood industry as a strategic sector, backed up by the operational budget for continuation of the project.

As a result, various parawood companies and support organizations are moving to start an industry-led loss reduction research project and other promotional organization led by FTI. Thus, although the implementation body was not established during the pilot project period, the stage seems to be set for the industry moving in that direction as JICA's support reaches a final stage.

- 2) Output 2 (Factories of the parawood working industry in Surat Thani make prototype furniture using design given by the JICA mission.)

Evaluation based on the indicator (20 prototype furniture made by factories or groups (at minimum)):

Two training courses, a beginners' course for training of basic technology and an advanced course for training of practical technology and skills, were conducted to teach skills required for commercial production of furniture that was based on new designs furnished by the JICA mission.

As a result of the training courses, many prototypes of parawood furniture based on new designs furnished by the JICA mission were made by not only existing furniture makers but companies that have newly entered into the furniture business, and graduates and students of the vocational training institute. And they were displayed at the First Parawood Woodworking Technology Exhibition.

Four manufacturers and two organizations (6 SMEs/organizations in total) exhibited new design furniture and 7 SMEs and one organization, including some of the above SMEs, exhibited existing furniture, building materials and woodworks at the exhibition.

Therefore, the result clearly indicates that Output 2 accomplished its target.

- 3) Output 3 (Factories in Surat Thani are investigated in view of waste reduction and loss minimization of lumbering processes.)

Evaluation based on the indicator (A report on research and diagnosis of five or more factories for loss reduction): Walailak University together with SMEs conducted a R&D project on loss reduction.

The field study was conducted for five parawood sawmills with drying facilities, which were selected for the study purpose.

The results of the field study were examined to identify differences among the sawmills and analyze factors for creating the differences, and loss reduction measures were compiled into a formal report, which was submitted on 25 February 2005. A general outline of the report was presented in the form of panel display at the first Parawood Woodworking Technology Exhibition. It was also presented at a forum that was held in conjunction with the exhibition. The report and its content attracted much attention from managers of local sawmills.

Again, Output 3 is considered to have accomplished its target.

- 4) Output 4 (An exhibition is held for parawood furniture and other parawood products made in Surat Thani.)

Evaluation based on the indicator (An exhibition of the prototype furniture and other parawood products): The first exhibition on woodworking technology and products was held at IPC10's exhibition hall between 18 – 21 February 2005, under the joint sponsorship of the JICA mission, DIP, and Surat Thani Province. It also received extensive support from a large number of organizations, including universities in Surat Thani (including the one that joined the loss reduction survey), vocational training institutes, the Federation of Thai Industry (FTI), the Thai Chamber of Commerce (TCC), local offices of central government ministries and agencies, and parawood and furniture industry associations.

The exhibition introduced the history of the rubber industry, and the current state of the parawood industry and its future vision, with display of parawood furniture of new designs furnished by the JICA mission, and locally made parawood products (furniture, construction materials, building members, etc.). Nine companies and three organizations participated in the exhibition, which attracted estimated 850 visitors. A Japanese delegation, consisting of 17 members, also visited Surat Thani to observe the exhibition.

Again, Output 4 is considered to have accomplished its target.

In conclusion, although Output 1 has not been realized during the project period, there are some moves in the industry to take its own initiatives, such as a voluntary research project on loss reduction and the establishment of a project implementation body. This represents a substantial change compared to the situation before the start of the pilot project. Thus, the level of achievement for Output 1 is rated at 40%. Meanwhile, other three outputs mostly accomplished their goals. Overall, the average level of achievement for the four outputs is assessed as 85%.

- (3) 03 Will the project purpose be achieved?

- 1) The accomplishment of Indicator 1 (An exhibition is opened every year by private initiative.) requires substantial efforts.

It is very important to hold the parawood woodworking technology exhibition annually in order to make the furniture of new design and loss reduction results known widely. While there is no industrial organization to promote such exhibition, a group of companies that plan to start a voluntary loss reduction research project can become a driving force for the annual exhibition in collaboration with universities, the provincial government and IPC10.

- 2) Indicator 2 (Survey on loss reduction in lumbering processes continues for three years increasing cooperative factories to 10 at minimum.) has high possibility to be accomplished for the following reason:

The loss reduction survey has created various ways to improve yield from raw materials and product quality and to reduce the time required for processing, which have been proposed to companies operating sawmills and drying facilities. And some of them have already introduced them for their own loss reduction efforts and have produced positive results in terms of value added by realizing quality improvement, and reduction of processing time and/or cost. Furthermore, a budget to continuously support the loss reduction research has been granted to Walailak University. Therefore, Indicator 2 has high possibility to be accomplished.

- 3) In particular, they were able to feel the effect of a new design on higher value added.

Few companies designed and developed their original products (including existing furniture makers) or manufactured furniture based on full-size drawings that were made from customers' drawings. Many of them engaged in furniture production with considerable rework and touch-up. Under the pilot project, they learned skills to make full-size drawings and manufacture furniture according to the drawings. As a result, they came to realize that they were able to reduce defects and rework significantly, which accompanied substantial cost reduction. Furthermore, they learned that furniture of a new design could allow them to change a pricing standard to their own advantage.

Given the increase in the number of companies that use the outcome of the loss reduction survey and/or that can manufacture furniture of a new design, therefore, it is now highly likely that the project purpose (increase in value added of the parawood industry (upstream/downstream)) can be accomplished, although one have to bear in mind that organizing the annual exhibition requires considerable efforts of cluster members.

(4) 04 Are there prospects that the overall goal will be achieved?

The accomplishment of the indicator (As of 2010, 60% or more of the total parawood industry in Surat Thani is associated for the cluster promotion.) depends on whether the cluster organization is established or not.

The terminal evaluation reveals that various moves are recently emerging, including a voluntary group of companies that has started a loss reduction research project and the Surat Thani government's policy change to position the parawood industry as the prefecture's strategic sector and to allocate a budget to promote the policy objective, including continuation of the loss reduction research project at Warailak University and continuation of HR development at the Surat Thani vocational training institute, in addition to IPC10.

Furthermore, some of the companies that have displayed new design furniture at the exhibition have begun to exchange ideas and opinions. Also, some companies are working to organize a project implementation body led by FTI, creating expectation for the establishment of the cluster promotion organization in the near future. Once the organization starts to function and the benefits of the pilot project expand further, more companies are expected to participate in the cluster activity.

If the above organization is formed and starts to function properly, we will be able to expect the accomplishment of the overall goal.

#### **3.4.2.2 Verification of the implementation process**

See Attachment 3-3 at the end of this chapter.

Verification of the implementation process was carried out for the following seven items by comparing the respective plans and results.

- 05 Were the activities implemented as planned?
- 06 Were there any problems in the method for technology transfer?
- 07 Were there any problems in the project management system?
- 08 Does the project have a high recognition in the implementing agency and counterpart?
- 09 Was a suitable counterpart assigned?



- 010 Is the degree of participation of the target group and related organizations in the project high?
- 011 What factors influenced the problems occurring in the project implementation process and produced effect?

(1) 05 Were the activities implemented as planned?

1) Activity to establish a pilot project implementation body

The preparatory committee for the establishment of the Design Center, consisting of five members, tried to prepare a prospectus and recruit participants. However, because none of the members represented a leading company in the industry or was a business leader, effective communication with potential members could not be made. Furthermore, some members opposed the parawood and woodworking technology exhibition in February 2005 and demanded that it be postponed until the majority of local companies became capable of manufacturing furniture. As a result, the committee was unable to continue its activity and was dissolved in late October 2004.

The major reason for the failure to make the committee operational seems to be the lack of ownership about the cluster activity among potential participants.

2) Training of engineers and technicians to participate in production of prototype furniture of new design  
It was conducted by establishing two training courses, beginner and advanced.

The beginners' course provided collective education to teach basic woodworking techniques and skills. It was primarily conducted at the Surat Thani vocational training institute by its instructors, and the JICA experts provided guidance as required. The curriculum was designed on the basis of that used at the training institute, with adjustment and modification being incorporated to reflect advice of the JICA experts.

The advanced course was conducted for three furniture manufacturers that intended to start production of high value added furniture of new design. The JICA mission furnished them with new furniture design drawings in order to allow managers, production leaders and skilled workers to select the most preferred design and make furniture according to it. In consideration of differences in product types and production equipment and techniques used by the three companies, JICA experts visited them twice per day on average to teach a broad range of techniques and skills,

ranging from preparation of full-size drawings and wood fittings, to actual furniture making, in response to the particular needs of each company and production facility. Note that JICA experts were accompanied by instructors of the vocational training institutes as far as possible to give them practical training for field instruction.

The above teaching methods are believed to have contributed greatly to the upgrading of skills of participants.

### 3) Loss reduction survey

For this purpose, five parawood sawmills/drying facilities, which intended to cooperate in measurement of log yields and the processing method/period and to conduct industry-academia joint research, were selected from those that had lumbering, drying, and chemical treatment processes. In addition, ten experts of Warailak University in the field of woodworking were hired for field survey.

The JICA mission defined the objective of the survey project, major study items and key points in data assortment and analysis, and local experts collected data in the field, identified problems, and devised loss reduction measures in cooperation of managers of the five sawmills. In the course of the survey, some companies have introduced the proposed loss reduction measures on an experimental basis, under guidance of the experts, and they have confirmed their effectiveness. Now, they intend to continue the industry-academia joint initiative in order to expand application of research results with higher efficiency, while broadening the scope of the research project.

Meanwhile, some companies were initially reluctant to disclose the results of field survey and later agreed as a result of discussion with the JICA mission and local experts, who explained that the survey project was indispensable for improving competitiveness of local industry and comparative analysis of individual companies was an important means to maximize a loss reduction effect. Under the consent of the five sawmills, comparative analysis of production loss taking into account variations due to the difference in the work method was conducted, problems were identified, and loss reduction measures were developed. On February 25, 2005, a formal report was compiled.

A general outline of the report was presented at the First Parawood Woodworking Technology Exhibition, in the form of panel display, and it was also presented at the forum that was held

concurrently with the exhibition. Effectiveness of the industry-academia study and research project was clearly demonstrated and inspired local sawmills/drying facilities and their owners greatly.

4) The parawood woodworking technology exhibition

At the First Parawood Woodworking Technology Exhibition, efforts were made to advertise that parawood was a recyclable natural resource by using the logo "ECO WOOD" in the exhibition's poster, signboard, and invitation letter. The exhibition was held at IPC10's exhibition hall between 18 and 21 February.

JICA experts developed a basic concept of the exhibition and a preliminary design of the exhibition site and hired a local company specialized in event organization for actual construction and display, which was recommended by the local business association. However, the company's work did not comply with the preliminary design in many respects and failed to call for display items from a sufficient number of companies. To open the exhibition on schedule, the JICA mission intervened and worked until midnight.

The exhibition is made up of several sections, including the history of the rubber industry, and the current state of the parawood industry and its future vision, general profiles of HR development organizations, product displays by various companies, demonstrations on handicraft production (batik and hand-knit products), and reference displays. The reference displays mean products made by manufacturers other than local companies in the target group, for the purpose of presenting a bird's-eye view of parawood products made within the prefecture, especially examples of parawood furniture that are accepted in the export market. The reference displays were made by major woodwork makers in Surat Thani, which made furniture and construction materials for export, as well as other organizations such as DIP's Furniture and Composite Industry Division (F&C) and a prison in Surat Thani that had its own furniture shop and made furniture of unique designs.

Product displays by local companies included not only furniture that was made on the basis of designs furnished by the JICA mission during the project period, but also their traditional product line, reflecting their willingness to show their entire offerings.

Four companies and two organizations displayed products of new designs, of which one company and one organization have recently entered the furniture business. The fact that they were able to display commercially marketable products indicates effectiveness of the training program. Seven companies and one organization (including those who made the reference displays) displayed their present product lines, including furniture, construction materials, and other woodworking products.

The exhibition attracted an estimated total of 850 visitors. According to the questionnaire survey conducted at the exhibition site, the visitors were composed of buyers (12%), lumbering, furniture, woodworking and construction materials industries (16.4%), government employees (24.4%), university professors and students (20.4%), others (21.6%), and unknown (5.2%).

The exhibition produced tangible benefits as evidenced by the fact that several sales negotiations are underway since then, including Japanese buyers who visited as part of a trade mission.

(2) 06 Were there any problems in the method for technology transfer?

Technology transfer required to achieve the project purpose includes the training of engineers and technicians to make new design furniture, promotion of the effective use of precious wood resources and the development of loss reduction technology for cost reduction, and know-how on the planning and management of the exhibition.

1) Training of engineers and technicians

First of all, the original training plan envisaged the use of Thai designers. However, in light of the fact that basic woodworking techniques should constitute an important element of furniture making skills, it was decided to design the training course in cooperation of the Surat Thani vocational training institute. Then, it was decided to provide beginner training by the institute's instructors and the JICA experts assisted curriculum design for the beginner course (62 hours) emphasizing on basic woodworking techniques.

The advanced course, intended for experienced workers of furniture manufacturers, was conducted in the form of direct technical assistance by the JICA experts who visited each factory and provided customized advice to reflect differences in product types and production equipment and techniques used among the factories.

As the instructors did not have sufficient teaching experience in furniture making techniques, they were given of an opportunity to learn teaching know-how by accompanying the JICA experts who visited furniture factories to teach the advanced course for experienced engineers and technicians.

As a result, the JICA experts was able to help the institute's instructors to understand the need for curriculum design and technical guidance/training according to the level of trainees, thereby to achieve the purpose of executing transfer of expertise on technical training.

The improvement of teaching techniques is evidenced from products displayed at the exhibition. Note that technology transfer to IPC10 was not made although it was said to have instructors in the field of woodworking, as no discussion was made on field guidance and no instructor was assigned to the advanced course.

## 2) Study and research on loss reduction

As for the loss reduction survey, it served as a good opportunity to promote understanding of effectiveness of industry-academia collaboration, especially benefits from assistance and input by university scholars. Now, some companies are moving to start joint initiatives with local universities in the field of research and experimental implementation of new techniques. Universities also share the same view and welcome the emergence of opportunities for collaboration with local companies, which are paving the way for long-term industry-academia initiatives.

## 3) Planning and management of the exhibition

Finally, transfer of know-how on the planning and management of the exhibition has not been made because an organization serving as an implementation body has still to be established.

### (3) 07 Were there any problems in the project management system?

Originally, the JICA mission considered the possibility of implementing the project under IPC10's ownership. However, IPC10 responded that "the formulation and development of the industrial cluster was not the scope of IPC10's service and there was no full-time staff assigned to the task." Thus, the JICA mission took the lead in arranging collaboration with the vocational training institute and universities (on the loss reduction study and research project), promoting participation of companies in the exhibition,

and keeping communication with FTI and TCC.

At the same time, DIP/BEED was actively involved in promotion of the project by understanding the intent of the cluster development activity and sent its staff to Surat Thani for assistance. In particular, it played a decisive role in promotion of seminars and the exhibition.

On the other hand, IPC10 was largely engaged in communication with the parawood industry and the establishment of a meeting room. Originally, the JICA mission hired Thai coordinators for these tasks, but they could not make much contribution due to the lack of knowledge on local and industry conditions. This has made the JICA mission realize the importance of finding a qualified coordinator.

(4) 08 Does the project have a high recognition in the implementing agency and counterpart?

At the initial stage of the pilot project, the counterpart did not have much awareness of the project because it did not understand the industrial cluster activity very well. In February, however, it gained recognition within IPC10 as the parawood woodworking technology exhibition was held and attracted market attention due to successful displays of new design furniture.

Similarly, the exhibition served as a good opportunity to increase interest of the parawood industry in the cluster activity as well as industry-academia collaboration. In particular, universities and BDS providers recognized the project and its contribution to local development through the establishment of the linkage to local parawood companies.

(5) 09 Was a suitable counterpart assigned?

The JICA mission selected IPC10 as its local counterpart, which served as a key base for industrial promotion in the Surat Thani area. It was considered to be qualified because it requested DIP to designate the parawood industry as a cluster development model. However, it did not have a budget to support cluster development activities nor full-time staff. IPC10 appointed a contact person for the JICA mission, but he was busy with other jobs and could not keep close communication with the JICA mission.

Also, local staff assigned to the pilot project was replaced with other, which disturbed with project implementation.

(6) 010 Is the degree of participation of the target group and related organizations in the project high?

At the initial stage of the pilot project, the project's intent has not been fully understood or recognized in the parawood industry.

The JICA mission decided to improve the industry's recognition through actual activities in the pilot project, and started technical guidance and training in the area of furniture making and promoted an industry-academia joint research project on loss reduction, while visiting parawood companies to encourage the understanding of and participation in the pilot project.

The efforts have borne fruit in October when the First Parawood Woodworking Technology Exhibition was finalized and the project was widely recognized by the target group, the parawood industry. Recognition was further improved by the success of the exhibition and the visit by the Japanese trade mission.

(7) 011 What factors influenced the problems occurring in the project implementation process and produced effect?

At the first seminar held in the initial stage of the pilot project, representatives of the parawood industry, universality and other HR development organizations, government offices, and financial institutions discussed on actual deployment of activities relating to the pilot project and promotion of cluster development activities. Then, they agreed to organize a preparatory committee for the establishment of "Surat Thani Design Center (tentatively named)" as a core organization to promote cluster activities and selected five committee members. However, the committee became inactive shortly after, partly due to the absence of members representing leading companies in the industry and partly due to a difference in opinion among the members as to priority of support, i.e., focused support for companies managed by innovative owners vs. broad support for smaller companies to improve their management base.

As a result, an organization responsible for continued implementation of the pilot project has not been formed, making the future of the exhibition uncertain.

Another problem was seen in the hiring of local aids. To ensure high quality of technical guidance and training service, the JICA mission hired a Thai designer in the initial stage of the pilot project, but she was

not able to fulfill an expected role of meeting and coordinating the local needs. Similarly, a Thai coordinator was hired in the initial stage to ensure smooth communication between the JICA mission and the parawood industry, companies participating in the cluster activity, related government offices, BDS providers, and other stakeholders. Again, she could not keep her job due to the lack of knowledge on local and industry conditions.

Thus, it is important to hire a local professional and a coordinator by examining his or her experience and local knowledge. Similarly, the hiring of a competent interpreter is very important as he or she affects performance of the JICA mission.

### **3.4.3 Five Evaluation Criteria**

The Evaluation Grid was filled in with the following survey results for analysis, followed by evaluation by the Five Evaluation Criteria. Refer to Attachment 3-4.

- Assessment of results and examination of implementation process (refer to 3.4.2)
- Analysis of records of pilot project implementation
- Interview survey of IPC10, DIP, etc.
- Interview survey of major companies, BDS providers, etc.
- Questionnaire survey at the 2nd Seminar (refer to Attachment 3-5 at the chapter end).

#### **3.4.3.1 Relevance**

This project is considered to be highly relevant for the following reasons:

Surat Thani has the largest area of rubber plantation in the country (accounting for more than 17% of the total) and development of the parawood industry cluster is widely recognized to meet the needs of local communities and industries. The prefectural government has recognized the pilot project as the second strategic industry next to tourism and has allocated a budget for supporting continued implementation of the pilot project.

Also, there is a large university emphasizing on research in the area of woodworking, as well as a university aiming to train engineers and technicians who can understand design and



workmanship-oriented production, thus creating an ideal environment for development of the industrial cluster.

Finally, the project is considered as a development project that meets foreign aid policy objectives of the Japanese government, which give priority to the development of the local economic base and human resources (HR) development, and it also meets JICA's development requirements emphasizing appropriateness for local conditions.

### **3.4.3.2 Effectiveness**

The project is considered to be highly effective for the following reasons:

The project aimed to produce the four outputs, of which three outputs have been mostly achieved, as discussed earlier, while one output (the establishment of a private-led organization to implement the pilot project and the cluster activity) has not reached its goal.

First of all, as for the training of engineers and technicians to create furniture of new design, and the loss reduction survey covering the lumbering process, a very high percentage of companies (83.3%) believed that the initiatives have contributed to the accomplishment of the goal of increasing value added of the parawood industry.

Some of the companies that participated in the loss reduction survey project have introduced the moisture conditioning technique to the drying process under technical assistance from the survey task team to reduce residual stress in wood and have successfully reduced the drying period by more than 20% by improving the ventilation system.

Also, the visit by the Japanese delegation to the Parawood Woodworking Technology Exhibition created an opportunity for communication between producers and users, which can lead to market development, product development, and technical assistance.

### **3.4.3.3 Efficiency**

Judging from the outputs and their levels of accomplishment, the project input is considered to be made

with a sufficient level of efficiency.

If efficiency is to be measured in terms of output, while one output – the establishment of the project implementation body – has still to be realized, other three outputs were accomplished and were highly valued in terms of efficiency, including human input, the assignment period, and content of support.

Furthermore, there was no impediment to affect efficiency, and industry-academia cooperation such as the loss reduction survey progressed smoothly.

As for technical assistance in production of furniture of new design provided by the JICA mission, some want continuation of Japanese experts in the area of prototype and commercial production.

#### **3.4.3.4 Impact**

Implementation of the project has produced the following impacts and effects, which will help accomplish the highest goal in the next three to five years:

The project sets forth the cluster vision to “innovate the parawood industry in Surat Thani,” with the overall goal of “reinforcing a driving force toward industry-wide innovation,” and activities were conducted with the primary objective to “increase valued added of the parawood industry.” According to the questionnaire survey, over 90% of companies expect that reinvigoration of cluster activities will drive innovation, indicating the accordance of the project purpose with the overall goal.

In addition, the cluster activities have successfully raised public awareness of environmental protection and there is an increasing interest in obtaining certification from the Forest Stewardship Council (FSC) and the Chain of Custody (COC).

Furthermore, a group of parawood furniture and woodworking manufacturers in Chon Buri and a group of parawood companies in Songkhla are stimulated by the cluster development activity in Surat Thani and are talking about formulation of their own clusters. Thus, the cluster activities and their effects are spreading in a variety of ways and directions.

### 3.4.3.5 Sustainability

The project has high potential in terms of sustainability by continuing and developing the pilot project further, provided that an industry-led organization should be established to promote project implementation.

Whether or not the pilot project can be continued and/or expanded after the completion of the JICA's assistance depends on availability of government support, including adequate financial assistance, BDS support by universities and HR development organizations, and willingness of the parawood industry to implement the project as their own initiative.

DIP under the Ministry of Industry is requesting to the Ministry of Finance a cluster development budget for the next fiscal year. The Surat Thani provincial government is also expected to continue its financial support.

In addition, the provincial government designated the parawood industry as the second strategic industry in mid 2005 and allocated a total of 2,890,000 Bahts for the continuation of the loss reduction research project and the training of furniture and woodworking skills after the completion of the present study. The budget will be allocated to IPC10, the universities and the vocational training institute.

Thus, DIP and Surat Thani are building an organization and a system to promote cluster development, including the formulation of a program for policy implementation and budget allocation. However, the lack of the organization (implementation body) that promotes cluster activities becomes the largest impeding factor.

The establishment of the project implementation body is indispensable for not only the continuation of the pilot project, but also promotion of collaboration with universities and HR development organizations, maintenance of the liaison function relating to government support, and promotion of communication and interaction with the Japanese trade mission. Now, the project's sustainability is entirely dependent on the presence and proper functioning of such organization.

## **3.5 Conclusion, Recommendations and Lessons Learned**

### **3.5.1 Conclusion**

(1) The pilot project was implemented according to the original plan and has achieved its purpose.

The terminal evaluation confirms that the project has been carried out according to its implementation plan and satisfied the Five Evaluation Criteria including sustainability.

(2) The networking of the cluster has made a significant progress.

Prior to the project, there was little interaction between parawood companies in Surat Thani and the industry had few contact or communication with universities and other HR development organizations or government organizations responsible for industrial promotion. The project has created opportunities for interaction among related parties in the industry, government and academia and has built up the cluster network. In particular, after the First Parawood Woodworking Technology Exhibition, talks on the possibility of cooperation between participating companies increased at an accelerated pace.

(3) Parawood companies in the cluster area increased interest in the downstream sector.

The project purpose was set to accord with the needs of local communities and industries, i.e., increase in value added of the parawood industry (upstream and downstream). In particular, an increasing number of companies find the downstream sector (furniture) to be attractive in the course of the pilot project, i.e. prototype production using new designs provided by the JICA mission, participation in the exhibition, and visit by Japanese buyers.

(4) The joint loss reduction survey has produced measurable results.

The survey project started with selection of five parawood mills that had the lumbering, drying and chemical (insecticide/fungicide) treatment processes and were willing to improve lumber yields and the processing method. The task team led by experts at Walailak University was organized and conducted field surveys to identify present conditions and analyze problems, followed by research and development on loss reduction measures. Some companies implemented proposed improvement measures and confirmed positive results.

A formal report on the loss reduction survey project was compiled in February 2005 and the results were presented at a forum held at the First Parawood Woodworking Technology Exhibition. Managers of local companies were impressed by the fruit produced from the industry-academia cooperation. And the Surat Thani provincial government has allocated a budget for continuation of the project.

- (5) The pilot project has established the basis of the provincial government's action to designate the parawood industry as a strategic industry in Surat Thani.

The provincial government watched the progress of the pilot project carefully and decided to position the parawood industry as the second strategic sector in Surat Thani. For its FY2005 budget, the province allocated 2.89 million Baht for continuation of the cluster development activity.

- (6) The project faced difficulty in organizing the cluster led by private enterprises.

At the first seminar, the establishment of a cluster promotion organization, so-called "Design Center," was proposed and agreed. A special committee was established and five members were selected. However, because the members were highest ranked persons in the companies they represented, they were not able to serve as a major driving force for the voluntary work of the committee. Thus, the committee discontinued its activity in late October 2004. Although an effort has been made to establish the organization led by corporate owners or managing directors with strong leadership, no result was produced at the end of the pilot project. At present, however, the need for the organization is increasingly recognized within the industry and its establishment will become an important agenda in the near future.

### **3.5.2 Recommendations**

- (1) The establishment of the cluster promotion organization led by local companies should be promoted to support continued implementation of the pilot project and the cluster development activities.
- (2) To provide hands-on training for engineers and technicians in the fields of furniture production and woodworking, formal measures should be devised to hire experts as instructors.

- (3) To promote understanding and communication between cluster members, the following activities should be carried out:
- Mutual factory visits and tours by managers of cluster member companies
  - Joint research projects led by cluster members and presentation meeting to report results
  - Overseas market study tours
  - Establishment of rules for management and use of furniture designs furnished by the JICA mission
- (4) Market development activities, both domestic and overseas, should be planned and carried out vigorously.
- Promotion of exchange of information with members of the Japanese delegation who visited the exhibition
  - Collection and publication of information on market and technology relating to housing, interior design and furniture
  - Creation of a logo representing a Surat Thani brand and establishment of rules for its use
- (5) To establish the Surat Thani brand, industrial standards for woodworking, jointed boards and sawn wood products, including the measurement and inspection methods, should be established and enforced.

### **3.5.3 Lessons learned**

- (1) The cluster activity should be planned and implemented under the initiative and will of local stakeholders.

This CSCD project was initiated without the presence of local promoters representing the private sector and an organization to promote the cluster development activity. At the initial stage of the project, as little support from IPC10 and the Surat Thani provincial government was expected, substantial time and effort was spent to organize the cluster activity itself, including promotion of a wide understanding and acceptance by potential stakeholders. Therefore, such supporting environment should have been provided prior to the start of the cluster activity.

- (2) The pilot project proved that the cluster activity could maximize its effectiveness by networking related parties.

The pilot project has produced successful results where that the network among private companies, and industry, government and academic circles functioned very well. In fact, networking is a major potential power to promote a cluster in any area. Effective use of the local network is undoubtedly the key to the success of the cluster activity.

- (3) A strong leadership is an essential element of the cluster activity.

The pilot project was started by a strong leadership of the JICA mission in Surat Thani where there was no cluster activity. In the future, local parties must take leadership if the pilot project continues to produce results. Only a sustainable leadership can energize the cluster activity.

- (4) The cluster activity must establish an effective market linkage.

In particular, the exhibition is an integral part of marketing activity and the visit by 17 Japanese potential buyers had significant impacts on local parawood product manufacturers. They must have learned that the exhibition and its results could lead to sales expansion, export opportunity, and technical cooperation. Thus, the priority of the industrial cluster activity should be placed on market development.

**Attachment 3-1 BDS Provider List for Pilot Project44****BDS provider for pilot project (1/4)**

<b>Name of organization:</b> Suratthani Institute for Skill Development, Region-11
<b>Type of Organization, Control organization:</b> Ministry of Labor
<b>Address:</b> 433 Moo5, Surat-Nasan, muang District, Tumbon Khuntaly, Suratthani, 84100
<b>Contact (PIC, TEL, etc.):</b> Vicha Theeraanuwath, Director Tel 077-211500, Fax : 077-211504.
<b>No. of employees (by type of job):</b>
<b>Established year:</b>
<b>Purpose of establishment and mission:</b> The Ministry of Labor established the institute as a vocational training center to provide skill training for pre-employment persons, training of company technicians and skill certification.
<b>Type of BDS :</b> 1. Administrative service 2. Education <u>3. Vocational training</u> 4. Financing 5. Technical instruction 6. Activities for unions/associations 7. Consultation 8. Distribution/logistics 9. material supply 10. Supply of infrastructures 11. Others (Product development)
<b>Facility and equipment for BDS etc.:</b> Band Saw, Table Saw, Jig Saw, Wood Lathe, Surface Planer, Spindle Molder Machine, Drilling Machine, Cold Press, etc.; Dormitory for trainees (10 rooms for two persons each)
<b>Past major activities:</b> The institute is operated with a vision of "Training Center for The Enterprise" and provides free skill training in hotel/restaurant service, machinery, woodworking, etc. As for woodworking, it planed to open two six-month courses per year; however, the applicants were only 1-2 persons and there was no wood material for training as well as almost no use of wood processing machinery. It had no communication with the parawood industry. Even a person in charge of the industrial cluster in IPC10 did not know the existence of woodworking courses in the institute.
<b>Actual activities for pilot project:</b> Two training courses, beginner and advanced, were conducted to train furniture/woodworking engineers and skilled workers. The beginner course was held at the institute by the institute's instructors for employees of SMEs newly entering into furniture production. Those who wish to learn furniture/woodworking skills, and who do not belong to cluster SME members, were accepted for training of basic skills of woodworking. After the basic training, they started to manufacture prototype furniture based on the new design that the JICA mission supplied for exhibiting them at the 1st Parawood Woodworking Technology Exhibition in February 2005. In order for visitors to understand the importance of instruction of basic woodworking skills, a model of wood joinery and joint work was made and shown in the exhibition. Trainees for Batik in the institute made cushions with "ECOWOOD" design, which is a beginning to expand the combination of woodworking with Batik.



**Prospects and improvement issues as BDS providers from now on:** Influenced by the exhibition to some extent, applicants to the Woodworking Department increased to 4 persons in May. The institute should make active PR to junior/senior high schools etc. on what it can provide for training. Surat Thani province has taken up the parawood processing industry as a strategic industry and appropriated the budget for the development. The institute will get 250 thousand Baht for skill training from the total budget. Technology/skill training is not always possible with only budget. The institute should seriously consider the employment of those who has experience in furniture production and/or the invitation of skilled labor of local furniture factory as a part time trainer. It is noted that how to use hand tools for woodworking and maintain them is vitally important to produce versatile quality furniture as well as how to operate woodworking machinery.

#### BDS provider for pilot project (2/4)

<b>Name of organization:</b> WALAILAK University, Institute of Research and Development
<b>Type of Organization, Control organization:</b> Walailak University, National University, Ministry of Education.
<b>Address:</b> 222 Thaibri, Tha-Sala Nakhon si Thamarat 80160
<b>Contact (PIC, TEL, etc.):</b> Tel 075-673557, Fax 075-672004, Dr. KAN, Director
<b>No. of employees (by type of job):</b>
<b>Established year:</b>
<b>Purpose of establishment and mission:</b> The university is positioned as a base for research in parawood processing industry in southern Thailand, by establishment of Institute of Research & Development within the university.
<b>Type of BDS :</b> 1. Administrative service <input type="checkbox"/> 2. Education <input checked="" type="checkbox"/> 3. Vocational training <input type="checkbox"/> 4. Financing <input type="checkbox"/> 5. Technical instruction <input checked="" type="checkbox"/> 6. Activities for unions/associations <input type="checkbox"/> 7. Consultation <input checked="" type="checkbox"/> 8. Distribution/logistics <input type="checkbox"/> 9. material supply <input type="checkbox"/> 10. Supply of infrastructures <input type="checkbox"/> 11. Others <input type="checkbox"/> <input checked="" type="checkbox"/> (Joint collaboration)
<b>Facility and equipment for BDS etc.:</b> It established the Institute of Research & Development within the university, which is the center of parawood processing industry in southern Thailand. The facilities include an insect research facility, woodworking machinery, artificial drying laboratory, testing equipment for wood, etc.
<b>Past major activities:</b> The university focuses on research on insects and development of wood textile, sawing and drying technology. An exchange between university and industry was not active.

**Actual activities for pilot project:** In carrying out the "research on loss reduction" which is one of the themes of the pilot project, 9 persons including professors, researchers and students of graduate schools conducted survey under the instruction of JICA mission how Surat Thani's parawood processing factories processed and treated parawood in sawing, chemical and drying processes. And they compared and analyzed differences in processing/treatment methods and loss generation to seek how to improve the processing/treatment methods and reduce the loss. The results were summarized in a report. Outputs from the research were exhibited at the 1st Parawood Woodworking Technology Exhibition and presented at the forum, giving a big impact on parawood sawing industry. In the course of the loss reduction research, they exchanged opinions about problems of factory, research period, expectation for the research, methodology of the research, etc. with factory owners and factory directors, aiming at the real collaboration between industry and academy. One of the companies which participated in the research took up the recommendation for improvement in its factory, resulting in favorable results especially in drying process. The drying period was reduced from 8 days to 6 days by changing installation method of fans according to the recommendation for improvement. In addition, humidity conditioning after drying enabled removal of unevenness in water contents and residual stress, leading to improvement and stability of product quality. It is said that it led to the enhancement of reputation of users. Most participating companies intended to continue the joint research with the university and some companies tried to extend the research results to the other sawing factories.

**Prospects and improvement issues as BDS providers from now on:** In the loss reduction research in the pilot project, professors, researchers, etc. visited factories with sawing and drying processes to survey toothings, measure sawing products, inspect insecticide and fungicide, measure temperatures, humidity and air volume, and grasp wood breaking, torsion and residual stress according to the different drying conditions. Due to the limitation of time, the research only made some recommendations, but they were highly evaluated by the parawood industry. Surat Thani province acknowledged the importance of the research to firmly implement the development of parawood processing industry in the region, and provided Walailak University with 440,000 baht for a budget for this year to continue this research. It is expected that the joint research will be extended to the investigation how to design drying schedule, how to use small bogies in sawing process or how to keep safety after chemical treatment. In order to realize this, the university keeps to make efforts to strengthen collaboration with industry.

**BDS provider for pilot project (3/4)**

<b>Name of organization:</b> Prince of Songkla University, Suratthani Campus
<b>Type of Organization, Control organization:</b> Songkla University, National University, Ministry of Education.
<b>Address:</b> Surat-Nasan Rd, makhamtia, Muang Suratthani .84100
<b>Contact (PIC, TEL, etc.):</b> Tel 077-355040, Fax 077-355041 Dr Somtip Denteravanich, Vice President
<b>No. of employees (by type of job):</b>
<b>Established year:</b>
<b>Purpose of establishment and mission:</b> It is a newly established campus of the largest university in southern Thailand. It makes HRD in bio technology, rubber sap, parawood, environment, waste treatment, palm oil and factory management. There are 1,500 students at present and will be 3,000 students in 2006.
<b>Type of BDS :</b> 1. Administrative service <input type="checkbox"/> 2. <input checked="" type="checkbox"/> Education <input type="checkbox"/> 3. Vocational training <input type="checkbox"/> 4. Financing <input type="checkbox"/> 5. Technical instruction <input type="checkbox"/> 6. Activities for unions/associations <input type="checkbox"/> 7. Consultation <input type="checkbox"/> 8. Distribution/logistics <input type="checkbox"/> 9. material supply <input type="checkbox"/> 10. Supply of infrastructures <input type="checkbox"/> 11. <input checked="" type="checkbox"/> Others <input type="checkbox"/> <input checked="" type="checkbox"/> (R&D)
<b>Facility and equipment for BDS etc.:</b> It has wide area of 440 lai ( 70.4ha). It plans to establish Industrial Development Center within the university to become the exchange base with industry.
<b>Past major activities:</b> It seems that the exchanges with local industry were few, because the campus was newly established and very busy for normalizing the departments as well as preparatory work for establishment of graduate school.
<b>Actual activities for pilot project:</b> The university cooperated with industrial cluster activities such as sending professors to a PCM seminar for preparation of the master plan on parawood industrial cluster as well as showing interests in development of ecological wood paint made from palm oil. At the 1st Parawood Woodworking Technology Exhibition, the university exhibited the present situation of the university, and expansion program of university and graduate school as well as research situation on an energy conservation house. It also demonstrated solid fuel production from saw dust discharged from sawing and woodworking processes, by setting a solid fuel production machine at the exhibition site.
<b>Prospects and improvement issues as BDS providers from now on:</b> The university features in different fields from Walailak University and Rajabhat University by establishing Industrial Development Center to conduct research on rubber sap, parawood, palm oil, waste treatment and energy conservation house. The ecological wood paint development from palm oil and research on an energy conservation house are greatly expected to lead the parawood processing cluster. From now on, the university is expected to strengthen the collaboration with parawood processing industry by discussing research subjects.

**BDS provider for pilot project (4/4)**

<b>Name of organization:</b> Surattthani Rajabhat University
<b>Type of Organization, Control organization:</b> National University, Ministry of Education.
<b>Address:</b> Surat-Nasan Rd, Amphur Muang, Surattthani,84100
<b>Contact (PIC, TEL, etc.):</b> Tel 077-355621, Fax 077-355468, Dr Narong Buddhichiwin, President
<b>No. of employees (by type of job):</b>
<b>Established year:</b>
<b>Purpose of establishment and mission:</b> It was established as a teacher college to train school teachers. It now is a university to contribute to the local industry.
<b>Type of BDS :</b> 1. Administrative service <input type="checkbox"/> 2. Education <input checked="" type="checkbox"/> 3. Vocational training <input type="checkbox"/> 4. Financing <input type="checkbox"/> 5. Technical instruction <input checked="" type="checkbox"/> 6. Activities for unions/associations <input type="checkbox"/> 7. Consultation <input type="checkbox"/> 8. Distribution/logistics <input type="checkbox"/> 9. material supply <input type="checkbox"/> 10. Supply of infrastructures <input type="checkbox"/> 11. Others <input type="checkbox"/> <input checked="" type="checkbox"/> (R&D)
<b>Facility and equipment for BDS etc.:</b> It is a only university having design department in the region and is equipped with facilities for handcraft, knitting, art, etc.
<b>Past major activities:</b> It has many experiences with assistance for OTOP including consultation of development of hand craft using plant fibers with traditional technology, instruction of interior product design, etc.
<b>Actual activities for pilot project::</b> The university participated in the 1st Parawood Woodworking Technology Exhibition. It exhibited panels showing the university's future image and direction for assisting local industry as well as interior products that the students made. It also assisted handcraft technical group members in demonstration of handcraft production.
<b>Prospects and improvement issues as BDS providers from now on:</b> A professor of the Design Department said that "The exchange with industry would become easier due to knowing management of SMEs" and "Students could be accepted to work in SMEs as an internship" by virtue of participating in the exhibition. The university, which had no contact with local industry, can start the exchange, leading to realization of "training of manufacturing engineers based on design" that the university director aims at. Fortunately the establishment of Design Department was approved by the Ministry of Education. However, the fulfillment of professors is an issue from now on. It is expected that the university makes further effort to secure practical professors and strengthening industry-academies collaboration.

**Attachment 3-2 Concept of Parawood Industrial Cluster- Surat Thani Design Center (PiC-SDC)  
(Proposed by the JICA mission)**

**I. Objective, Function and activities of PiC-SDC**

**Objective**

Parawood Industrial Cluster- Surat Thani Design Center (PiC-SDC; a tentative name) is newly established as a core provider of Business Development Service (BDS) for the parawood industrial cluster in Surat Thani in order to innovate in the industry aiming at effective resource use, higher productivity and better competitiveness. This contributes to increase of value added of the circulating-type wood resource, sustainable growth of the industry and vitalization of the regional economy.

**Functions and Activities**

PiC-SDC works for the following functions and activities for members of PiC-SDC and the industry in Surat Thani as well. In execution of the activities, PiC-SDC requests cooperation of members and/or employs outside experts as required. The word of "design" has wide range of meanings in the proposed PiC-SDC.

**1) Clustering**

- Gatherings and friendship of members for cluster promotion
- Recruitment of new members
- Promotion of joint projects among enterprises, academics and administrative bodies
- Research of advanced clusters

**2) Operation**

- Regular and extraordinary meetings of members
- Fund raising and management
- Issuing of a PiC-SDC bulletin
- Public relations concerning PiC-SDC activities
- Communication with official and public agencies

**3) Events and services**

- Competitions of new designs of wooden products
- Competitions of woodworking technology
- Mutual visits to factories and BDS providers (Academics, etc.)
- Certification for a logo mark of "Surat Thani Brand" to the member companies
- Seminars, workshops and forums

**4) Business Development Service (BDS)**

- Technological R&D (e.g. the loss reduction in sawing and drying processes, JICA)
- Human Resource Development (HRD) (e.g. training in the furniture-making technology, JICA)
- Market development (Sales of "Surat Thani Brand" to the market)
- New design development of parawood products
- Information services in marketing, technologies, management, etc.

**II. Organization and membership of PiC-SDC**

**Eligibility for regular members**

PiC-SDC is a sort of private same trade association having regular members.

Regular members are those enterprises which are located in the Surat Thani province and manufacturing parawood products including lumbars and timbers, jointed boards and panels, housing materials, furniture and fixture, toys etc.

**PiC-SDC Founding Committee**

Members for a PiC-SDC founding committee were selected as follows at the seminar held on 21 and 22 August 2004: This committee will recruit members and officially establish the PiC-SDC expectedly in October 2004.

Chairman:	Mr. Supachai	Ecofurn Co., Ltd.
Vice Chairman	Mr. Punsak	Mean Mile Co. Ltd.
Vice chairman	Mr. Sanong	VS Surat Parawood
Committee Member	Mr. Prathip	Institute Skill Development Region 11
Committee Member	Ms. On Anon	Indharoj

In addition to the above, companies of KCL, Wattana, BNS, Pyramid, Siam Riso, Choosak Prasang Parawood, Sun Paratech and Fancy Wood Industries have shown interest in participating in PiC-SDC as the regular members.

**III. Office and facilities for PiC-SDC**

Songkla University Surat Thani Campus offered an office space for PiC-SDC when the JICA mission interviewed and IPC 10 will provide facilities for an office space and conference rooms as required.

**IV. Self financing**

PiC-SDC is to basically be a self financing organization in view of independency as a private association and sustainability of operation. Expected incomes to PiC-SDC are assumed below:

**Royalties**

- 1) Certification fees for "Surat Thani Brand" being issued by PiC-SDC
- 2) Royalty to use a logo mark of the Surat Thani Brand certified by PiC-SDC
- 3) Royalties for owned by PiC-SDC

Incomes of PiC-SDC shall mainly stand on value of a logo mark for Surat Thani brand issued by PiC-SDC and intellectual property rights owned by PiC-SDC as its goal. Quality of the Surat Thani brand parawood products shall be assured by FSC and COC certification, rigid application of Surat Thani standards that is developed by PiC-SDC for parawood products, etc. PiC-SDC has rights to certify member companies or their products in use of the logo mark of the Surat Thani brand. New designs and intellectual property rights shall be obtained through its R&D activities or by donation.

**Membership fees**

Regular members pay annual member fees for the bulletin periodically issued by PiC-SDC.

**Subsidies**

Government offices subsidize PiC-SDC for operating such non-profit organizations or for performing specific activities if any subsidizing system is available.

**Compensation for training and guidance**

- 1) Merchandizing of new products
- 2) Product design development
- 3) Technology development
- 4) Marketing
- 5) Corporate management

PiC-SDC intermediates outside experts to companies and organizes seminars, workshops and forums.

**Incomes from events and services**

Beneficiaries of the events and the services pay participation fees, etc.

#### **V. Initiation of the PiC-SDC establishment**

PiC-SDC will grow step by step with the following initial steps.

- 1) The number of regular members might be as many as ten (10) enterprises named above when PiC-SDC starts.
- 2) The PiC-SDC Founding Committee shall soon establish PiC-SDC with the about 10 members preparing a memorandum relating to rules of PiC-SDC.
- 3) The board members of the PiC-SDC will mostly be same as those of the PiC-SDC Founding Committee for convenience.
- 4) For a while, neither a permanent staff nor an office space is necessary. The activities of PiC-SDC shall be done by voluntary of members through regular and extraordinary meetings.
- 5) First jobs of PiC-SDC shall be the pilot project comprising a) the loss reduction project with Walailak University and b) the furniture-making technology upgrading with the JICA expert and Surat Thani Institute for Skill Development Region 11.
- 6) PiC-SDC is expected to grow in accordance with increasing number of members, securing a funding mechanism and success in the pilot project.

#### **(Note) Parawood Cluster Promotion Council in Surat Thani**

In addition to PiC-SDC, it is recommendable to set up a promotion committee for the parawood industry in Surat Thani. This committee will be formulated by government offices and BDS providers including academies, financial institutions, industrial associations, etc. The functions of the council are to be as follows:

- 1) Follow-up of the master plan and action plan for the parawood cluster promotion in Surat Thani
- 2) Coordination and monitoring of BDS providers relating to the parawood industry in Surat Thani as a BDS facilitator
- 3) Preparation of policies and system for the parawood cluster promotion
- 4) Supporting of BDS providers including PiC-SDC in terms of funding, public relations in the province and the country, commendations and approval and license, etc.

The following organizations, what the JICA mission interviewed, showed interests and promised to cooperate in cluster promotion at seminars, workshops and the interviews. For a while, IPC 10 takes care of establishment of the council as the secretariat.

#### Government offices

- Surat Thani Province Governor's office,
- IPC10, PIO and BOI of Ministry of Industry
- Export Promotion Center of Ministry of Commerce

#### Academies and training centers

- Rajabhat Surat Thani University
- Songkla University Surat Thani Campus
- Surat Thani Institute for Skill Development Region 11
- (Walailak University in Nakhon Si Thammarat)

#### Financial institutions

- SME bank Surat Thani
- SICGC Surat Thani
- Office of the Rubber Replanting AID Fund (ORAF)

#### Industrial associations

- FTI Surat Thani
- TCC Surat Thani
- Thai Parawood Association (TPA)
- PiC-SDC

**Attachment 3-3 Performance Table**

Question	Evaluation questions		Criteria & Method for Judgment	Required Data	Information Source	Data Collection
		Sub-question				
Verification of performance	(01)	Was the input conducted as planned?	Achievement rate	Planned and actual data	PP Report and PP records	Review of the report/records
	(02)	Was the output conducted as planned?	Achievement rate	Planned and actual data	PP Report and PP records	Review of the report/records
	(03)	Will the project purpose be achieved?	Evaluation by JICA mission	Planned and actual data	<ul style="list-style-type: none"> <li>Target group, BDS providers</li> <li>2<sup>nd</sup> seminar</li> </ul>	<ul style="list-style-type: none"> <li>Questionnaire survey</li> <li>Interview survey</li> </ul>
	(04)	Are there prospects that the overall goal will be achieved?	Evaluation by JICA mission	Target and prospect	<ul style="list-style-type: none"> <li>Target group, BDS providers</li> <li>2<sup>nd</sup> seminar</li> </ul>	<ul style="list-style-type: none"> <li>Questionnaire survey</li> <li>Interview survey</li> </ul>
	(05)	Were the activities implemented as planned?	Comparison of Before and After	Target and prospect	PP Report and PP records	Review of the report/records
	(06)	Were there any problems in the method for technology transfer?	Evaluation of replies/views by JICA mission	<ul style="list-style-type: none"> <li>Replies of questionnaire</li> <li>Views of related organizations</li> </ul>	Shindanshi-ho, IPC, BDS providers, SMEs	<ul style="list-style-type: none"> <li>Questionnaire survey</li> <li>Interview survey</li> </ul>
	(07)	Were there any problems in the project management system?	Evaluation by JICA mission	Collaboration among DIP, working group, IPC, local government, new organization and JICA mission	PP Report and PP records	Review of the report/records
Verification of implementation process	(08)	Does the project have a high recognition in the implementing agency and counterpart?	<ul style="list-style-type: none"> <li>Comparison of With &amp; W/O</li> <li>Comparison of Before &amp; After</li> </ul>	Recognition of major concerned organizations	2 <sup>nd</sup> seminar etc.	Questionnaire survey at the 2 <sup>nd</sup> seminar
	(09)	Was a suitable counterpart assigned?	Analysis by JICA mission	Performance of DIP & IPC	PP Report and PP records	Review of the report/records
	(010)	Is the degree of participation of the target group and related organizations in the project high?	<ul style="list-style-type: none"> <li>Comparison of With &amp; W/O</li> <li>Comparison of Before &amp; After</li> </ul>	Recognition of major concerned organizations	2 <sup>nd</sup> seminar	Questionnaire survey at the 2 <sup>nd</sup> seminar
	(011)	What factors influenced the problems occurring in the project implementation process and produced effect?	Analysis by JICA mission	(+) : PCM, Visits and communication, Provide of design, (-) : Less collaboration of IPC, Less man-month of JICA mission, Less experience in joint work	PP Report and PP records	Review of the report/records



**Attachment 3-4 Five Evaluation Criteria**

[ Relevance ]

Evaluation questions		Criteria & Method for Judgment	Required Data	Information Source	Data Collection
Question	Sub-question				
<b>&lt; Necessity &gt;</b>					
(11) Was the project in line with the needs of the target region and society?		The majority gives positive replies.	Replies of question	Participants of 2 <sup>nd</sup> seminar	Questionnaire survey
(12) Was the project in line with the needs of the target group?		Positive replies by most of the target group.	Replies of question	Participants of 2 <sup>nd</sup> seminar	Questionnaire survey
<b>&lt; Priority &gt;</b>					
(13) Is the project consistent with Thai development policy and regional development strategies?	Is the effect that the project aiming for in line with Thai national policy and regional development strategies?	<ul style="list-style-type: none"> <li>Existence of policy and strategies</li> <li>PP effect is evaluated by the project purpose.</li> </ul>	<ul style="list-style-type: none"> <li>Cluster development policy (existing to be confirmed)</li> <li>Sector (national and provincial strategies)</li> </ul>	<ul style="list-style-type: none"> <li>DIP</li> <li>Provincial governor</li> </ul>	Review of documents
	Does the project address the focus for aid?	Review of the description	MOFA documents	Japan's Thai assistance policy	Review of documents
(14) Is the project consistent with Japan's ODA policy and JICA's plan for country-specific program implementation?	Does the project have relationship with JICA's plan for a country-specific program implementation?	Review of the description	JICA documents	JICA's plan for a country-specific program implementation	Review of documents
<b>&lt; Suitability as a means &gt;</b>					
(15) Was the selection of the target group appropriate?	Is the selection of industrial sub-sector and site of the target group appropriate?	Potential for growth and enhancement of competitiveness	Material availability, demand situation, existence of BDS providers, local competitiveness	<ul style="list-style-type: none"> <li>Reports by JICA mission</li> <li>In-house data</li> </ul>	Review of the reports
	Is the size of the target group adequate?	Definition of cluster (Degree of accumulation)	<ul style="list-style-type: none"> <li>No. of SMEs for cluster</li> <li>Area</li> </ul>	<ul style="list-style-type: none"> <li>Estimation by JICA mission and JICA reports</li> <li>Estimation by map</li> </ul>	Review of the report and map
(16) Was the project suitable in terms of the impartiality?	Were there any ripple effects beyond the target group?	<ul style="list-style-type: none"> <li>Ripple effect existing or not</li> <li>Opinion of related organizations</li> </ul>	Universities, vocational training institute, other BDS providers, provincial government, governmental offices (IPC)	<ul style="list-style-type: none"> <li>PP report</li> <li>Seminar participants</li> </ul>	<ul style="list-style-type: none"> <li>Review of PP report</li> <li>Questionnaire survey</li> </ul>

			etc.)	
(17) Did Japan have an advantage in technology?	<ul style="list-style-type: none"> <li>• Advantage in the sector</li> <li>• Cluster development experience</li> </ul>	<ul style="list-style-type: none"> <li>• Woodworks (design, processing, import)</li> <li>• Japan's cluster development policy/experience</li> </ul>	<ul style="list-style-type: none"> <li>• Statistics</li> <li>• METI documents</li> </ul>	<ul style="list-style-type: none"> <li>• Data collection by internet etc.</li> <li>• Review of documents</li> </ul>

[ Effectiveness ]

Question	Evaluation questions		Criteria & Method for Judgment	Required Data	Information Source	Data Collection
	Question	Sub-question				
<b>&lt;Achievement of outputs&gt;</b>						
(21) Were the outputs achieved?			(As per performance table)	(As per performance table)	(As per performance table)	Review of performance table
<b>&lt;Achievement of project purpose&gt;</b>						
(22) Is the project purpose achieved?			(As per performance table)	(As per performance table)	(As per performance table)	Review of performance table
<b>&lt;Causal relationship&gt;</b>						
<ul style="list-style-type: none"> <li>• Was the output sufficient to achieve the project purpose?</li> <li>• Did the output contribute to the achievement of the project purpose?</li> </ul>	(23: Output 1) Was the private cluster promotion organization built up and did it function and contribute to the achievement of the project purpose?	<ul style="list-style-type: none"> <li>• Existence of private cluster development organization</li> <li>• Prospects for the progress</li> </ul>	Degree of achievement of the target	Major 3 companies	Interview survey	
	(24: Output 2) Did the Surat Thani parawood working industry involve in prototype production of new design furniture?	<ul style="list-style-type: none"> <li>• Number of participating companies and products at the exhibition</li> <li>• Situation of trainees at the training school</li> </ul>	Degree of achievement of the target	<ul style="list-style-type: none"> <li>• PP report, related materials</li> <li>• Training school</li> </ul>	<ul style="list-style-type: none"> <li>• Review of materials</li> <li>• Interview survey</li> </ul>	
	(25: Output 3) Did (Do) the study on loss reduction in sawing process contribute to the increase of value-added?	<ul style="list-style-type: none"> <li>• Evaluation by the sector and participating companies</li> <li>• Prospects for increase of participating companies</li> <li>• Prospects for continuation of research by Walailak University</li> </ul>	Degree of achievement of the target	<ul style="list-style-type: none"> <li>• Companies having sawing process</li> <li>• Seminar participants</li> <li>• Walailak University</li> </ul>	<ul style="list-style-type: none"> <li>• Interview survey of 5 participating companies</li> <li>• Questionnaire survey at the seminar</li> <li>• Interview survey of Walailak University</li> </ul>	
	(26: Output 4) How did the	<ul style="list-style-type: none"> <li>• Number of exhibition visitors and</li> </ul>	Degree of achievement of	<ul style="list-style-type: none"> <li>• PP reports, related</li> </ul>	<ul style="list-style-type: none"> <li>• Review of materials</li> </ul>	

prototype furniture exhibition contribute to the achievement of the project purpose?	the target	questionnaire survey results	documents	• Questionnaire survey
	Analysis of interview survey results	Support by provincial governor office	Vice provincial governor	Interview survey
(27) Are their any factors that contribute to the achievement of the project objective?	Analysis by JICA mission	PDM:	PP report	Review of materials and interview survey as required
(28) Are the important assumptions from the output to the project purpose correct also at the present point of time? Was there any influence from the important assumptions?	Analysis by JICA mission	<ul style="list-style-type: none"> <li>Stable supply of raw material</li> <li>Continuous implementation of PP</li> </ul>	Related materials and memo papers of JICA mission	Review of materials
(29) What are the inhibiting factors for the achievement of the project purpose?	Analysis by JICA mission	<ul style="list-style-type: none"> <li>Lack of cooperative attitude by the group</li> <li>Lack of understanding for cluster approach</li> </ul>		

[ Efficiency ]

Evaluation questions		Criteria & Method for Judgment	Required Data	Information Source	Data Collection
Question	Sub-question				
<b>&lt;Production of output&gt;</b>					
(31) Is the production output adequate?		(As per performance table)	(As per performance table)	(As per performance table)	Review of performance table
<b>&lt;Causal relationship&gt;</b>					
(32) Were the activities sufficient to produce the output?		Evaluation of performance of output by actual inputs	(As per performance table)	(As per performance table)	Review of performance table
(33) Are the important assumptions from the activities to the output correct also at the present point of the time? Was there any influence from the important assumptions?		Confirmation of completed facts	PDM:	PP report	Review of the report
(34) Are there factors that inhibit efficiency?		Cost overrun items	Actual PP cost accounting record	JICA mission	Review of the cost record
<b>&lt;Timing&gt;</b>					

Seen from the achieved output, were the quality, quantity and timing of the inputs appropriate?	(35) Were the number of experts, their field of expertise and the timing of the dispatch appropriate?	Comparison between planned and actual values	Planned and actual values	Performance table	Review of performance table		
	(36) Were the number of Thai coordinators, their field of expertise and the timing of hiring appropriate?		Planned and actual values	Performance table	Review of performance table		
	(37) Were the number of Thai designers, their field of expertise, capability and the timing of hiring appropriate?		Planned and actual values	Performance table	Review of performance table		
	(38) Were the number of Thai researchers for loss reduction, their field of expertise, capability and the timing for hiring appropriate?		Planned and actual values	Performance table	Review of performance table		
	(39) Were the number of Thai interpreters and secretaries, their field of expertise, capability and the period appropriate?		Planned and actual values	Performance table	Review of performance table		
	(310) Were the number of counterparts (DIP, IPC), their assignment, their field of expertise, capability and the timing for hiring appropriate?		Planned and actual values	Performance table	Review of performance table		
	(311) Were the activities implemented at the right timing?		Planned and actual values	PP record by JICA mission	Review of materials		
	<b>&lt;Cost&gt;</b>		Comparison between planned and actual values	PP budget and actual accounting document	PP accounting record by JICA mission	Review of materials	
	(312) Were the actual PP costs adequate?		Degree of Thai expert performance	Man-month of Thai and Japanese experts	PP record by JICA mission	Review of materials	
	(313) Were the costs adequate compared to similar projects?						

[ Impact ]

Evaluation questions		Criteria & Method for Judgment	Required Data	Information Source	Data Collection
Question	Sub-question				
<b>&lt;Prospects for the achievement of the overall goal&gt;</b>					
(41) Looking at the input and output performance and at the activity status, are there prospects that the overall goal will be produced as an effect of the project?		Comparison between Before and After	<ul style="list-style-type: none"> <li>Awareness whether cluster activities will develop to innovation or not</li> <li>Prospects of sustainability of PP</li> </ul>	SMEs, training school, universities, other BDS providers	Questionnaire survey at seminar
(42) Are there prospects that the achievement of the overall goal will have an impact on the development plan of Thailand?		Share of products in Thailand and prospects for growth	Share of products in Thailand (raw material, delivered amount of parawood products)	Statistics material (Material used at the exhibition)	Review of materials
(43) Are there factors that inhibit the achievement of the overall goal?					
<b>&lt;Causal relationship&gt;</b>					
(44) Are the overall goal and the project purpose consistent?		Qualitative evaluation by JICA mission	Opinions of concerned persons	Seminar participants	Questionnaire survey
(45) Are the important assumptions from the project purpose to the overall goal correct also at the present point of time? Is the possibility high that important assumptions are true?		Evaluation by JICA mission	Opinions and prospects by concerned persons	Seminar participants	Questionnaire survey
<b>&lt;Ripple effect&gt;</b>					
Were (Will be) there any positive or negative impacts beside the overall goal?	(46) Influence on the establishment of policies and on the preparation of laws, systems and standards	Degree of systematization for the nationwide dissemination	Opinions of government, especially NESDB and DIP	DIP, Steering committee	<ul style="list-style-type: none"> <li>Discussion in meetings</li> <li>Interview survey</li> </ul>
	(47) Influence on the environmental preservation (acquisition of certification)				
	(48) Influence on the cluster activities and the joint work for regional industry development				
	(49) Acknowledgement of effectiveness of collaboration between industry and academies				
	(410) Influence on acknowledgement of Surat Thani parawood industry and (export) market extension				
(411) Are there any other negative influences?	Comparison between Before and After	Subjects on negative influence	JICA mission (record and evaluation)	Review of materials	

## [ Sustainability ]

Question	Evaluation questions		Criteria & Method for Judgment	Required Data	Information Source	Data Collection
	Question	Sub-question				
<b>&lt;Aspects of policy and system&gt;</b>						
(51)	Do DIP and IPC plan to continue assistance for Surat Thani pilot project after the completion of JICA assistance? Are there firm measures to support the extension of cluster activities after the completion of the pilot project?		Existence of related documents	Written policy and program	DIP, NESDB	Interview survey
(52)	Is there prospect that the nationwide cluster development program will be authorized within this year?		Existence of related documents	Written policy and program	DIP, NESDB	Interview survey
<b>&lt;Aspects of organization and financing&gt;</b>						
(53)	Has the private organization that can continue the project after the completion of JICA technical assistance been already established? If not, is there prospect to build up such organization?		Analysis of interview survey results	Information by interview survey	Major 3 companies, IPC10	Interview survey
(54)	Is a sense of ownership towards the project at the implementing agencies sufficiently secured? Is the leadership of IPC10 built up?		Analysis of questionnaire/interview survey results	<ul style="list-style-type: none"> <li>Evaluation of IPC10 by concerned persons in Surat Thani</li> <li>Support to the organization</li> </ul>	<ul style="list-style-type: none"> <li>Concerned persons in Surat Thani</li> <li>IPC10</li> </ul>	<ul style="list-style-type: none"> <li>Questionnaire survey</li> <li>Interview survey</li> </ul>
(55)	Is the budget including operating expenses secured? Are sufficient budget measures taken by Thai side?		Whether budget is accepted or not	DIP information	DIP	Interview survey
(56)	Are efforts for independent securing financial resources proceeding smoothly?		Whether there is own financing or not	Voluntary operation plan and its progress	<ul style="list-style-type: none"> <li>New private organization</li> <li>DIP/IPC10</li> </ul>	Interview survey
<b>&lt;Aspects of technology&gt;</b>						
(57)	Can concerned people get proper understanding of cluster activities?		Evaluation of actual results of cluster involvement	Actual results of cluster involvement	PP record	Review of PP record
(58)	Is the applied cluster development technology (mechanism) an applicable technology to other regions? How high is the provability that the implementing agency can maintain the mechanism for its dissemination?		Existence of dissemination plan and analysis of interview results	Dissemination plan	<ul style="list-style-type: none"> <li>DIP, IPC10</li> <li>Organizations involved in cluster activities</li> </ul>	<ul style="list-style-type: none"> <li>Questionnaire survey</li> <li>Interview survey</li> </ul>
(59)	Can the implementing organization continue the activities to improve furniture production technology?		Analysis of interview survey results	Securing inputs (HR, budget, material)	Training school, BSID	Interview survey

(510) Can the loss reduction study in sawing continue?	Whether budget is accepted or not.	Securing inputs (HR, budget, material)	Walailak University	Interview survey
<b>&lt;Aspects of society, culture and environment&gt;</b>				
(511) Are there any inhibiting factors against effect of sustainability?	Analysis of discussion results	Understanding of present situation and prospects	JICA mission, DIP, IPC10	Discussion
<b>&lt;Comprehensive sustainability&gt;</b>				
(512) Considering the above aspects as a whole, is the sustainability high or low?	Analysis of discussion results	Understanding of present situation and prospects	JICA mission, DIP, IPC10	Discussion

### Attachment 3-5 Results of Analysis of Questionnaire Survey at the 2nd Seminar

**Participants registered : 64** ( Enterprises 21, Governments/Academies/Mass-media 43 )

**Total number of reply : 33** ( Enterprises 12, Governments/Academies/Mass-media 21 )

**Rate of reply : 51.6%** ( Enterprises 57.1%, Governments/Academies/Mass-media 48.8% )

Figures in parenthesis at the end of each question indicate the related question No. of Attachment 3-4 "Five Evaluation Criteria".

#### A. Needs and implementation method of the pilot project

- (1) Did you know that the JICA mission prepared the master plan on development in June 2004 taking opinions of the people relating to the parawood industry in Surat Thani ? (08, 10)

Answerer	Knew well (%)	Did not know (%)	Total(%)
Enterprises	75.0	25.0	100
Officials/Academies	81.0	19.0	100
<b>Total</b>	<b>78.8</b>	<b>21.2</b>	<b>100</b>

- (2) Did you know that the pilot project(PP) including the exhibition and the study for loss reduction was implemented by a joint work between the JICA mission and the people relating to the parawood industry in Surat Thani ? (08, 10)

Answerer	Knew well (%)	Did not know (%)	Total (%)
Enterprises	91.7	8.3	100
Officials/Academies	90.5	9.5	100
<b>Total</b>	<b>90.9</b>	<b>9.1</b>	<b>100</b>

- (3) Did the contents of the pilot project meet the needs of the Surat Thani province and society? (11)

Answerer	Yes (%)	No (%)	Others (%)	Total (%)
Enterprises	83.3	0	16.7	100
Officials/Academies	90.5	0	9.5	100
<b>Total</b>	<b>87.9</b>	<b>0</b>	<b>12.1</b>	<b>100</b>

- (4) Did the contents of the pilot project meet the needs of people who engage in the parawood industry in Surat Thani? (12)

Answerer	Yes (%)	No (%)	Others (%)	Total (%)
Enterprises	91.7	0	8.3	100
Officials/Academies	76.2	0	23.8	100
<b>Total</b>	<b>81.8</b>	<b>0</b>	<b>18.2</b>	<b>100</b>



- (5) The JICA mission dispatched two Japanese experts four times, with about one-month interval, for the period of six and half months of the pilot project. Do you consider the number of experts, expertise of them and the dispatch period were appropriate? (35)

Answerer	Yes (%)	No (%)	Others (%)	Total (%)
Enterprises	66.7	16.7	16.6	100
Officials/Academies	57.1	14.3	28.6	100
<b>Total</b>	<b>60.6</b>	<b>15.2</b>	<b>24.2</b>	<b>100</b>

- (6) Did you learn from the Japanese experts on new way of thinking, new procedure of project planning and implementation, new technology, etc? (06)

Answerer	Appropriate (%)	Not enough (%)	Others (%)	Total (%)
Enterprises	33.3	25.0	41.7	100
Officials/Academies	47.6	14.3	38.1	100
<b>Total</b>	<b>42.4</b>	<b>18.2</b>	<b>39.4</b>	<b>100</b>

- (7) Was the pilot project designed and implemented so as to give equal opportunity and fairly distribute benefits to stakeholders in the region? (16)

Answerer	Yes (%)	No (%)	Others (%)	Total (%)
Enterprises	41.7	25.0	33.3	100
Officials/Academies	66.7	9.5	23.8	100
<b>Total</b>	<b>57.6</b>	<b>15.1</b>	<b>27.3</b>	<b>100</b>

#### B. The pilot project purpose and the overall goal

- (8) The project purpose of the pilot project is set as follows: Value-added of the parawood industry (including up-stream and down-stream increases in Surat Thani. For this purpose, the following activities were done in the pilot project. Do you think they contribute to achieve the purpose? Please answer including the possibility in a few years from now on.

##### 1) Making furniture prototypes on the new designs provided by the JICA mission (24)

Answerer	Contribute ( % )	Not contribute ( % )	Others ( % )	Total (%)
Enterprises	75.0	16.7	8.3	100
Officials/Academies	85.7	9.5	4.8	100
<b>Total</b>	<b>81.8</b>	<b>12.1</b>	<b>6.1</b>	<b>100</b>

## 2) Study for loss reduction in lumbering processes ...Increasing value added of the up-stream (25)

Answerer	Contribute ( % )	Not contribute ( % )	Others ( % )	Total (%)
Enterprises	83.3	0	16.7	100
Officials/Academies	90.5	4.8	4.7	100
<b>Total</b>	<b>87.9</b>	<b>3.0</b>	<b>9.1</b>	<b>100</b>

## 3) Exhibition for prototype furniture and woodworking products in Surat Thani...Increasing value added of the down-stream (26)

Answerer	Contribute ( % )	Not contribute ( % )	Others ( % )	Total (%)
Enterprises	91.7	8.3	0	100
Officials/Academies	90.5	4.8	4.7	100
<b>Total</b>	<b>90.9</b>	<b>6.1</b>	<b>3.0</b>	<b>100</b>

(9) Do you think the pilot project will contribute to achieve the project purpose as a whole? Please answer including the possibility in a few years. (03, 22)

Answerer	Will contribute ( % )	Won't contribute ( % )	Others ( % )	Total (%)
Enterprises	83.3	8.3	8.4	100
Officials/Academies	66.7	14.3	19.0	100
<b>Total</b>	<b>72.7</b>	<b>12.1</b>	<b>15.2</b>	<b>100</b>

(10) The Overall goal, beyond the pilot project purpose, is set as follows: Innovating thrust is strengthened in the Surat Thani parawood industry. Do you think the pilot project will contribute to this overall goal? Please answer including the possibility in four or five years. (04, 41)

Answerer	Will contribute ( % )	Won't contribute ( % )	Others ( % )	Total (%)
Enterprises	83.3	8.3	8.4	100
Officials/Academies	71.4	9.5	19.1	100
<b>Total</b>	<b>75.8</b>	<b>9.1</b>	<b>15.1</b>	<b>100</b>

(11) If the added value of the Surat Thani parawood industry increases (achievement of the project purpose), and also if the cluster activities become energetic(no serious outside problem), do you think the sale of the Surat Thani parawood industry will be promoted(achievement of the overall goal)? (44, 45)

Answerer	Will be promoted ( % )	Won't be promoted ( % )	Others ( % )	Total (%)
Enterprises	91.7	0	8.3	100
Officials/Academies	95.2	0	4.8	100
<b>Total</b>	<b>93.9</b>	<b>0</b>	<b>6.1</b>	<b>100</b>

## C. The impact of the pilot project purpose and the overall goal

- (12) Through implementation of the pilot project, have local related people become aware better that parawood is a recyclable and environmentally friendly resource and importance of FSC acquisition.? (48)

Answerer	Became better (%)	No effect by PP (%)	Others (%)	Total (%)
Enterprises	83.3	16.7	0	100
Officials/Academies	90.5	9.5	0	100
<b>Total</b>	<b>87.9</b>	<b>12.1</b>	<b>0</b>	<b>100</b>

- (13) Through implementation of the pilot project, have local related people become aware better of knowledge and understanding on cluster movements and effectiveness of it? (08, 10, 49, 57)

Answerer	Became better (%)	Not remarkably (%)	Others (%)	Total (%)
Enterprises	66.7	25.0	8.3	100
Officials/Academies	76.2	14.3	9.5	100
<b>Total</b>	<b>72.7</b>	<b>18.2</b>	<b>9.1</b>	<b>100</b>

- (14) Through implementation of the pilot project, have local related people become aware better of knowledge, understanding and effectiveness of joint works among industry, academy and government? (410)

Answerer	Became better (%)	Not remarkably (%)	Others (%)	Total (%)
Enterprises	83.3	8.3	8.4	100
Officials/Academies	81.0	0	19.0	100
<b>Total</b>	<b>81.8</b>	<b>3.0</b>	<b>15.2</b>	<b>100</b>

- (15) Through the implementation of the pilot project, has the market of the Surat Thani parawood industry been expanded? Or do you see its possibility including market in Japan? (411)

Answerer	Can apply well (%)	Cannot apply (%)	Others (%)	Total (%)
Enterprises	83.3	8.3	8.3	100
Officials/Academies	95.2	0	4.8	100
<b>Total</b>	<b>90.9</b>	<b>3.0</b>	<b>6.1</b>	<b>100</b>

#### D. Sustainability of the pilot project

(16) It is assumed that the pilot project will be continuously conducted as a cluster activation program even after termination of the JICA assistance and an exhibition for parawood industry will be held next year in Surat Thani. In such case, it is necessary for the industry to establish an implementation body. Do you think the implementation body will be established until August this year? (53)

Answerer	Can be done ( % )	Difficult ( % )	Others ( % )	Total (%)
Enterprises	66.7	8.3	25.0	100
Officials/Academies	57.2	19.0	23.8	100
<b>Total</b>	<b>60.6</b>	<b>15.2</b>	<b>24.2</b>	<b>100</b>

(17) Assuming that the pilot project will be continuously conducted, do you think leadership and ownership of IPC 10 will be established?

Please answer including expectation. (54)

Answerer	Can be done ( % )	Difficult ( % )	Others ( % )	Total (%)
Enterprises	33.3	25.0	41.7	100
Officials/Academies	38.1	19.0	42.9	100
<b>Total</b>	<b>36.4</b>	<b>21.2</b>	<b>42.4</b>	<b>100</b>

(18) The JICA Mission and DIP/IPC10 have taken various methods to design and implement the pilot project such as the sit-in meeting with the local people, the consensus orientation by the PCM participatory approach, the one-and night-stay workshop, etc. Do you think these methods can apply to develop other clusters? (58)

Answerer	Can apply well ( % )	Cannot apply ( % )	Others ( % )	Total (%)
Enterprises	91.7	0	8.3	100
Officials/Academies	76.2	4.8	19.0	100
<b>Total</b>	<b>81.8</b>	<b>3.0</b>	<b>15.2</b>	<b>100</b>

Annex

## Annex

### Methodology of Terminal Evaluation

#### 1 Objective of Terminal Evaluation

The terminal evaluation examines whether a project is properly producing effects at the end of the project period. Results of terminal evaluation are utilized to decide whether the project be terminated or followed up. The lessons drawn from the results are also fed back as "lessons learned" to similar types of projects.

#### 2 Methodology of Terminal Evaluation

##### 2.1 Work Flow of Terminal Evaluation

Work flow of terminal evaluation is shown in Figure Annex 2-1.

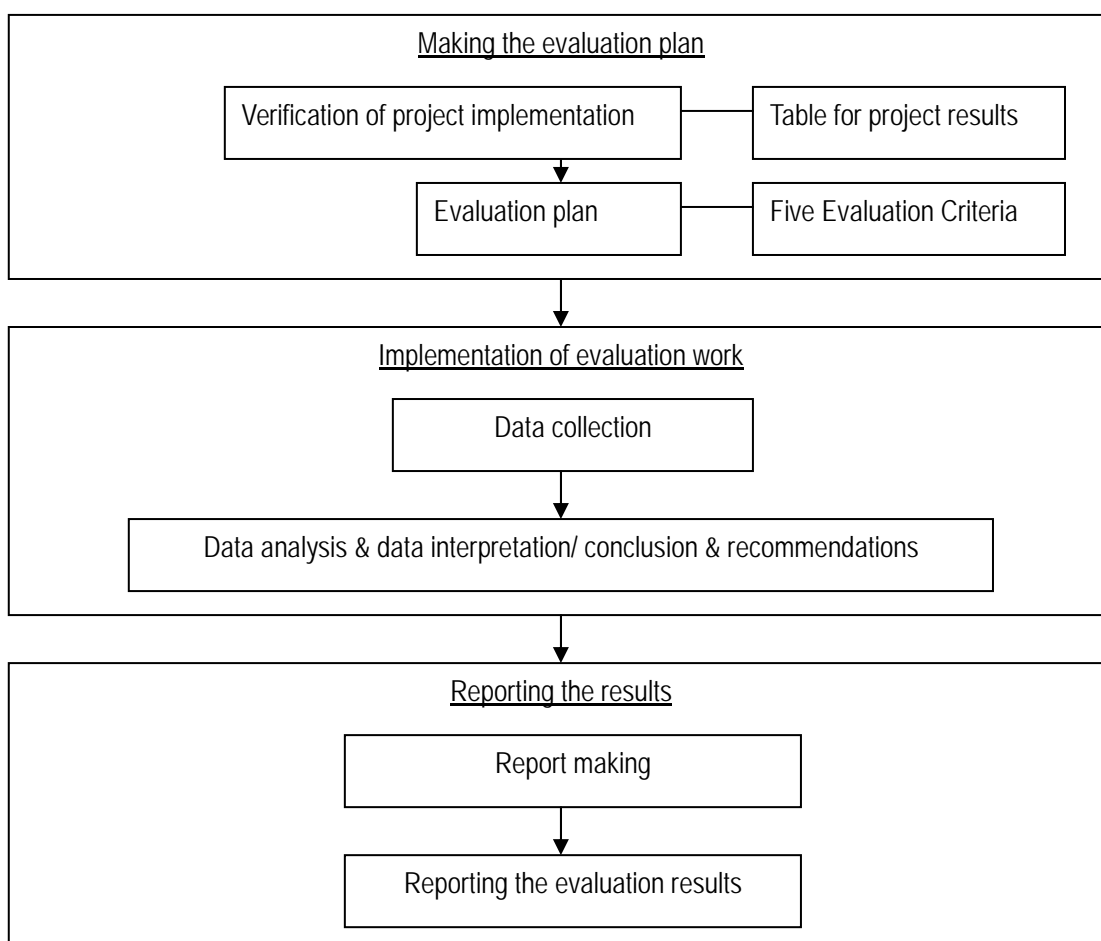


Figure Annex 2-1 Work Flow of Terminal Evaluation

## 2.2 Situation of Project and Logframe (PDM)

Logframe (PDM) is a useful tool to understand what project objectives, activities and inputs are, how target values and measurement are selected, and what project risks are. The logframe has been used for the planning and management of diverse projects. The logframe may provide the evaluator with information about the actual situation and logics or theories relevant to the project to be evaluated. The following information can be obtained through the logframe.

### Information to be obtained through the logframe

- Expected effects (project purpose) and outputs in the project
- Target values in output and project purpose as a basis for judgment
- Means for verification (which is useful for considering survey methods)
- Some external factors and risks that influence project performance
- Inputs/resources
- Availability of monitoring information etc.

## 2.3 Verification of Project Implementation

Table Annex 2.1 shows the table for the project results (for field survey) to assess the pilot project. It consists of two subjects: the verification of project performance and the verification of the implementation process

### (1) Verification of project performance

The verification of project performance was conducted to understand what the project has achieved and to verify whether the level of achievement meets expectation. Information on project performance includes the results of inputs and outputs, and the degree of achievement of the project purpose and the overall goal. The evaluator mainly collects and organizes information on whether the objectives are achieved as planned based on the target value specified in the form of indicators.

### (2) Verification of the implementation process

The verification of the implementation process was carried out for the purpose of investigating the whole process of activities and what is happening during the project implementation. The evaluator examines the dynamism within the project by focusing on such aspects as to whether its activities were carried out as planned; whether a project was properly managed; whether stakeholders of a project worked together effectively; or how the beneficiaries perceived the situation. An emphasis is placed on grasping what happened in the course of project implementation. The verification is made on not only whether activities were conducted as planned but also what influenced the achievement of outputs and project purpose.

The verification of the implementation process increases effectiveness of the project by maximizing the strength of the project while avoiding unnecessary risks. The results of verification of the implementation process are important information to analyze the factors that affect the generation of project effects.

Table Annex 2-1 Summary Table for Evaluation of the Project Results

Evaluation questions		Basis for judgment	Data needed	Data sources	Data collection methods
Main Questions	Sub-questions				
<b>Verification of project performance</b>	Was the "Input" provided as planned?				
	Was the "Output" yielded as planned?				
	Is the "Project Purpose" expected to be achieved?				
	Does "Overall Goal" have prospects to be achieved?				
<b>Verification of the implementation process</b>	Were "Activities" performed as planned?				
	Were there any problems in technology transfer?				
	Were there any problems in technology transfer?				
	Did implementation organizations and counter part understand the project well?				
	Was the suitable counterpart assigned?				
	Did the target group and concerned organization actively participate in the project and understand it well?				
	What factors influenced the problems occurring in the project implementation process and the produced effects?				

#### 2.4 Value Judgment Based on the Five Evaluation Criteria

It is an important element for evaluation to make a value judgment based on the achievement of the expected results. JICA adopted the Five Evaluation Criteria for conducting a project evaluation, which was proposed by the Development Assistance Committee (DAC) at the Organization for Economic Cooperation



and Development (OECD) in 1991. These five criteria, as shown below, are intended to be used for evaluating development assistance activities applying a comprehensive set of criteria.

- Relevance: A criterion for considering the validity and necessity of a project regarding whether the expected effects of the project (or project purpose and overall goal) meet the needs of target beneficiaries; whether the project intervention is appropriate as a solution for a problem concerned; whether the contents of the project is consistent with policies of the recipient country and Japan; whether the project strategies and approaches are relevant; and whether the project is justified to be implemented with Japan's public funds earmarked for ODA purposes.
- Effectiveness: A criterion for considering whether the implementation of project has benefited (or will benefit) the intended beneficiaries or the target society.
- Efficiency: A criterion for considering how economic resource/inputs are converted to actual results. The main focus is on the relationship between project costs and effects.
- Impact: A criterion for considering the effects of the project with an eye on the long-term effects whether direct or indirect, positive or negative, intended or unintended.
- Sustainability: A criterion for considering whether produced effects continue (or has prospects to continue) after termination of the assistance.

Table Annex 2-2 shows the relationship between the Five Evaluation Criteria and the logframe. Note that the Five Evaluation Criteria include evaluation of other subjects which are not specified in the logframe.

Table Annex 2-2 Five Evaluation Criteria and Logical Framework

	Relevance	Effectiveness	Efficiency	Impact	Sustainability
Overall goal	Conformity of the project purpose and the overall goal to the recipient country's needs at the time of evaluation	Degree to which the achievement of the project purpose is seen in the outputs	Extent to which the inputs are effectively converted into the outputs	Positive and negative influences that appeared directly and indirectly as a result of the project	Extent to which benefits are sustained even after the completion of cooperation
Project purpose					
Outputs					
Inputs					

Terminal Evaluation: Terminal evaluation is performed upon completion of a project, focusing on its relevance, effectiveness and efficiency. Based upon the results of the evaluation, JICA determines whether it is appropriate to complete the project or necessary to extend follow-up cooperation.

Example of Logical Framework (PDM )

Narrative Summary	Objectively Verifiable Indicators	Measures of Verification	Important assumptions
<u>Overall goal</u> : Indirect/long-term effects, impact on target society	Indicators to measure the achievement in terms of the overall goal	Information resources of indicators to the left	Assumptions necessary for the effects of the project to be sustainable
<u>Project purpose</u> : Direct benefits to the target groups or society	Indicators to measure the achievement in terms of the project purpose	Information resources of indicators to the left	External factors that must be satisfied to achieve the overall goal
<u>Outputs</u> : Services and results produced by the activities	Indicators to measure the achievement in terms of the outputs	Information resources of indicators to the left	External factors that must be satisfied to achieve the project purpose
<u>Activities</u> : Activities to realize the outputs	<u>Inputs</u> : Resources required for carrying out the activities (human resources, funds, facilities and equipment, etc.	Information resources of indicators to the left	External factors that must be satisfied to achieve the outputs
			<u>Prerequisite conditions</u> must be met before the beginning of the project

## 2.5 Relationship between Logframe (PDM) and Evaluation Plan

Utilization of the logframe as a tool to classify various project information is important to reflect it in the evaluation plan to be followed as the next step. The logframe contains some useful information for making evaluation plans. For instance, the evaluation questions about effectiveness and impact can reflect the logframe's model for causal relationships. Also, target values for indicators and means of verification can be the basis for identifying necessary data and data collection methods. A conceptual view of use of the logframe for creating a evaluation plan is illustrated in Annex 2-2.

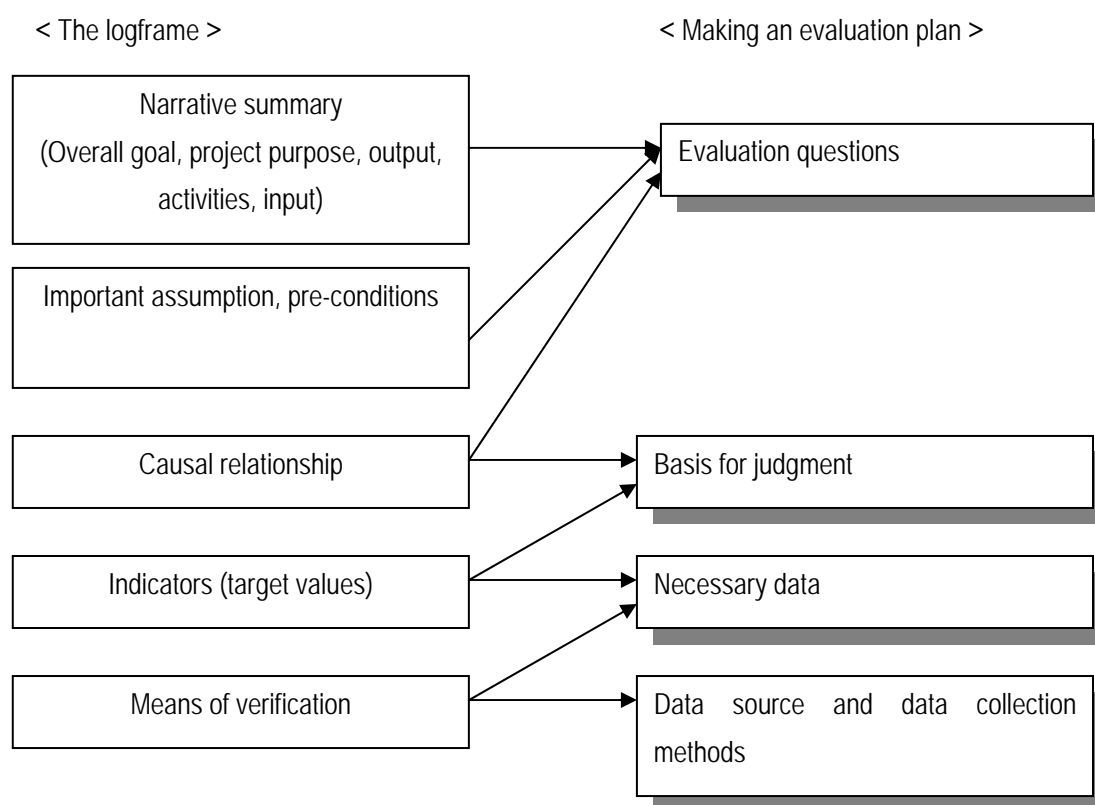
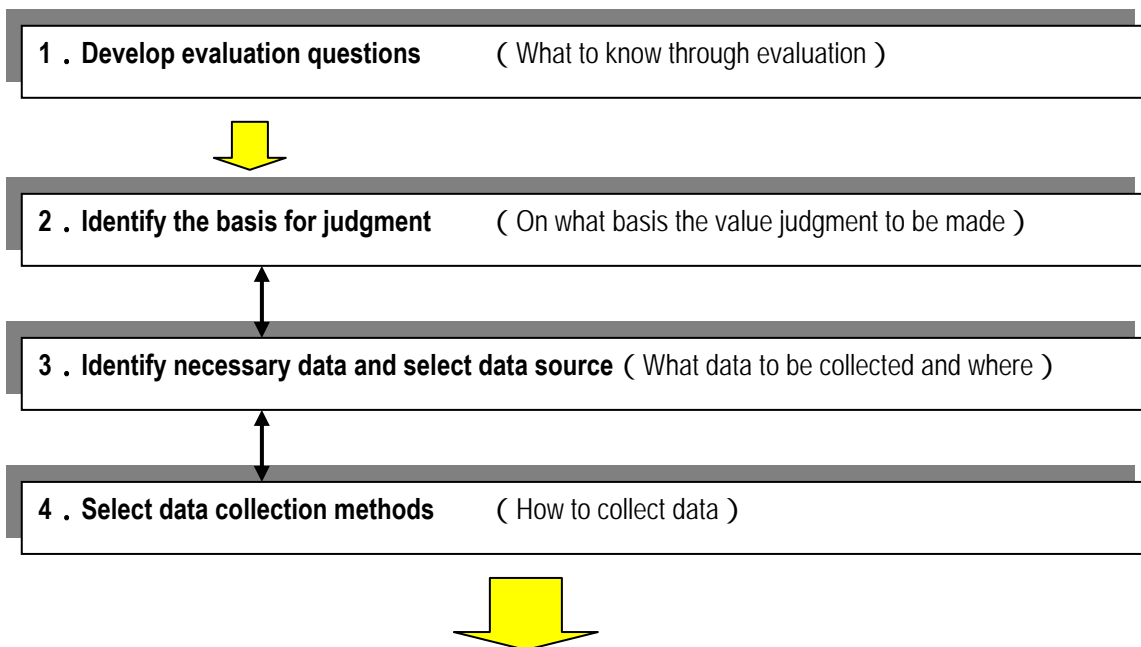


Figure Annex 2-2 Utilization of the logframe to make an evaluation work plan

## 2.6 Evaluation Plan

Making an evaluation plan is a process to determine what and how to implement the evaluation in line with its purpose. An evaluation study is usually limited in its budget and time, and therefore an effective and efficient way to conduct the study should be well developed. Specific methods for the evaluation survey is investigated based on the steps of making an evaluation plan as shown in Figure Annex 2-3, utilizing contents (target values, objectively verifiable indicators, means of verification) in the logframe which is a tool for project management. (These steps are interrelated with each other, and thus are in many cases developed at the same time.)

The results of the evaluation plan are summarized in the "Evaluation Grid" which is a tool for implementing the evaluation survey.



Evaluation Grid

Evaluation Criteria & Others	Evaluation questions		Basis for judgment	Required data	Information source	Data collection method
	Main questions	Sub-questions				
Relevance						
Effectiveness						
Efficiency						
Impact						
Sustainability						
Others						

Figure Annex 2-3 Steps of Making the Evaluation Plan