

STUDY REPORT
ON
THE PROJECT FOR THE IMPROVEMENT OF HOUSING
FOR LOW-INCOME PEOPLE (PHASE 3)
IN
THE DEMOCRATIC SOCIALIST REPUBLIC OF SRILANKA

March 1997

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PREFACE

In response to a request from the Government of Democratic Socialist Republic of Sri Lanka, the Government of Japan decided to conduct a basic design study on the Project for the Improvement of Housing for Low-Income People (Phase 3) and entrusted the Japan International Cooperation Agency (JICA) to conduct the study with the assistance of the Japan International Cooperation System (JICS).

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between our two countries.

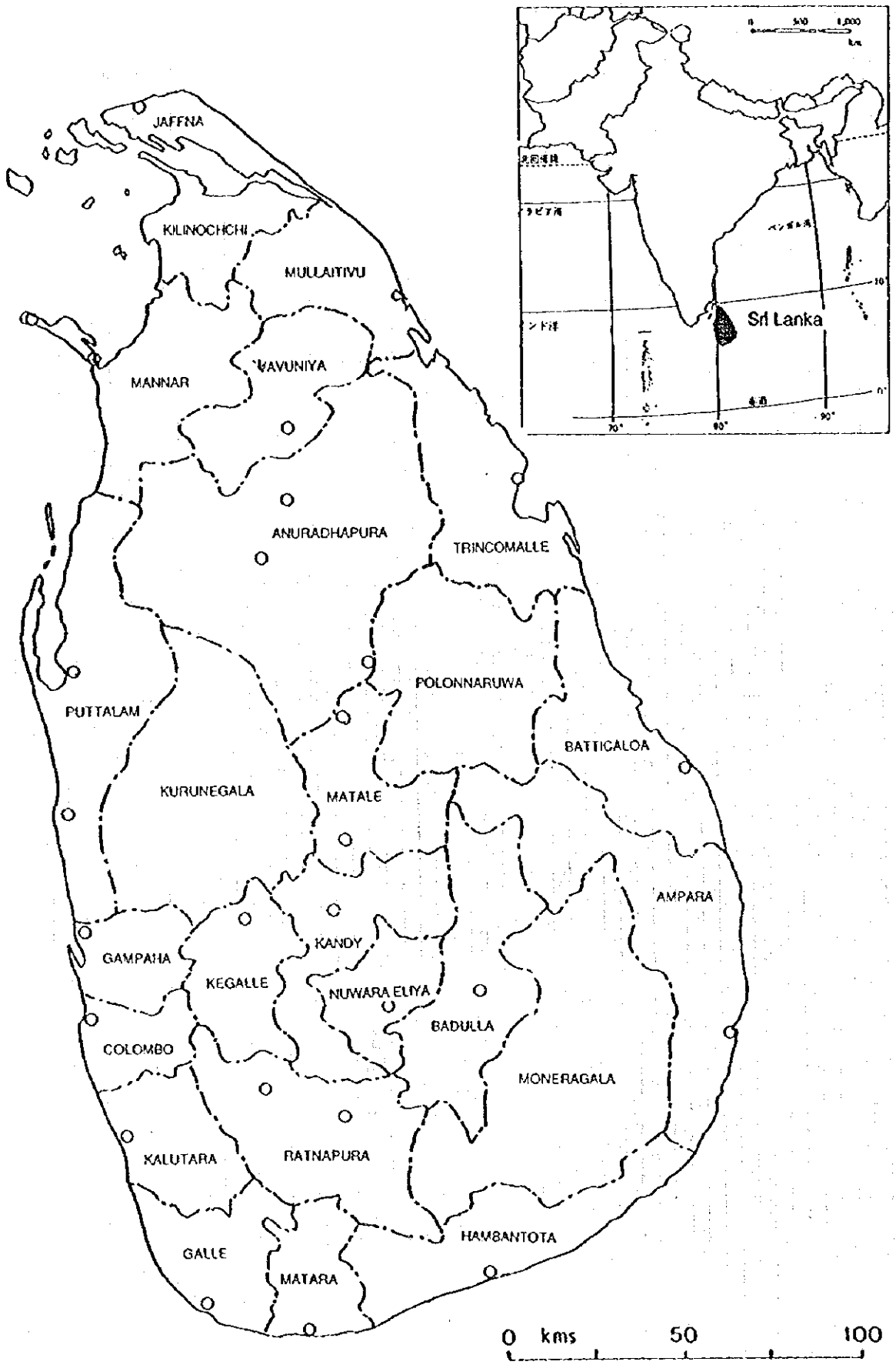
I wish to express my sincere appreciation to the officials concerned of the Government of Democratic Socialist Republic of Sri Lanka for their close cooperation extended to the team.

March, 1996

Kimio Fujita

President

Japan International Cooperation Agency



Location Map

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Location Map

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Chapter 1 Background of the Project

The main industry in the Democratic Socialist Republic of Sri Lanka is agriculture, which is largely dominated by plantations of tea, rubber and coconut, etc. which cover 40% of the overall cultivated land. Important issues in Sri Lanka today are the improvement of housing for these plantations workers and farmers in surrounding areas to stimulate the vitalization of rural villages and improve productivity, and the improvement of living conditions in the slums, etc. that can be found in urban areas.

With a view to achieving these goals, the Government of Sri Lanka has been advancing the National Housing Development Plan (1995-1999), which aims to construct 125,000 houses for low income people working on the plantations and living in the rural villages and cities. However, due to budget difficulties, the government is unable to fully carry out the investment necessary for implementation of the said plan. It was in these circumstances that the Government of Sri Lanka in 1994 requested the Government of Japan to provide grant aid for the procurement of materials necessary for the construction of 26,000 houses, which were most urgently needed within the said housing plan.

Chapter 2 Contents of the Project

2-1 Objectives of the Project

The Project aims to procure galvanized iron roofing sheets (GIRS) and G.I. screws with washers to be used in the construction of 26,000 houses, which are the most urgently required of the 125,000 houses planned for construction under the National Housing Development Plan (1995-1999).

2-2 Basic Concept of the Project

The request is for enough sheets (see Table 2-1) necessary to construct 26,000 houses for households with a monthly income of no more than Rs. 2,500, however, upon monitoring the distribution of galvanized iron sheets in past project phases (see Table 2-2), it was found that enough for just 3,600 and 13,000 houses per year (approximately 8,300 houses per year) had been distributed. At this pace it would require more than three years to distribute the sheets needed for construction of the requested 26,000 houses in the country's 25 states, however, as is pointed out later, galvanized iron sheets are not suited to long-term storage. (See the * note on following page).

Therefore, in consideration of preserving the quality of the galvanized iron sheets, the number of sheets shall be limited to those which can be fully distributed within around two years, i.e. enough for 15,000 houses, and the breakdown of distribution among the states shall be left to the discretion of the implementing agencies on the Sri Lanka side.

Table 2-1 Distribution Plan

Destination (State Name)	Quantity (Houses)	Breakdown (Sheets)	
		Corrugated Sheets	Plain Sheets
1 AMPARA	606	21,210	1,818
2 ANURADHAPURA	934	32,690	2,802
3 BADULLA	1,079	37,765	3,237
4 BATTICALOA	500	17,500	1,500
5 COLOMBA	970	33,950	2,910
6 GALLE	2,131	74,585	6,393
7 GAMPAHA	2,196	76,860	6,588
8 HAMBANTOTA	831	29,085	2,493
9 JAFFNA	737	25,795	2,211
10 KALUTARA	1,711	59,885	5,133
11 KANDY	2,853	99,855	8,559
12 KEGALLE	1,360	47,600	4,080
13 KILINOCHCHI	133	4,655	399
14 KURUNEGALA	2,547	89,145	7,641
15 MANNAR	173	6,055	519
16 MATALE	1,177	41,195	3,531
17 MATARA	1,522	53,270	4,566
18 MULLAITIVU	128	4,480	384
19 MONERAGALA	597	20,895	1,791
20 NUWARA ELIYA	960	33,600	2,880
21 POLONNARUWA	311	10,885	933
22 PUTTALAM	910	31,850	2,730
23 RATNAPURA	1,231	43,085	3,693
24 TRINCOMALEE	296	10,360	888
25 VAVUNIYA	107	3,745	321
Total	26,000	910,000	78,000

Source: Application Form presented by the Government of Sri Lanka

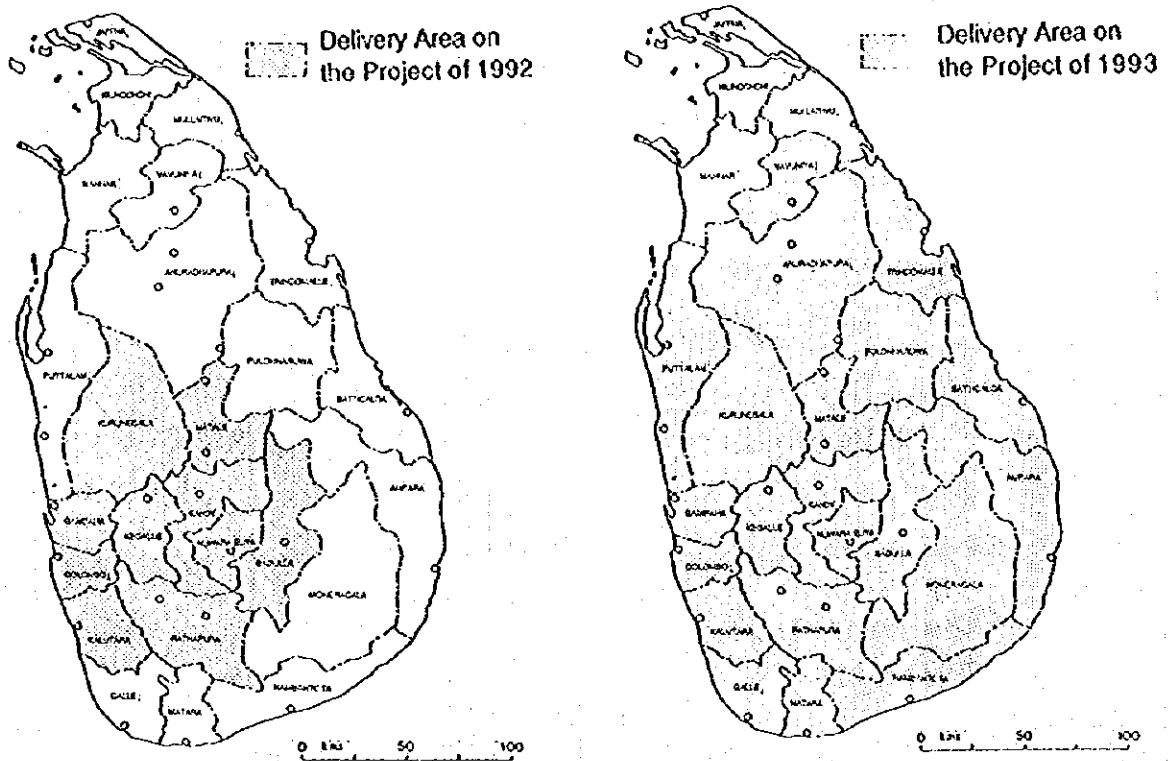


Figure 2-1 Distribution Target Areas in Past Projects

Table 2-2 Distribution Conditions in Past Projects

	Distributed Q'ty (t)	Households	Shipping Date	End of Distribution Monitoring	Months Required	Average Annual Distribution	
						Quantity (t)	Households
1992 (phase 1)	1,690	7,766	94. 2	96. 6	26	780	3,584
1993 (phase 2)	2,471	19,469	95. 3	96. 8	18	1,647	12,979

Source: Request presented by the Government of Sri Lanka

Note) * White rusting of galvanized iron sheets

The most important thing to beware of when storing galvanized iron sheets is the occurrence of white rusting, which can lead to deterioration of the sheets. The greatest problem with white rust is that when galvanized iron sheets are left for long periods in humid areas or areas that come into contact with rain, the white rust spreads and reduces the thickness of the galvanized layer, until eventually the iron comes into contact with air and suffers from red rust.

The mechanism behind the occurrence of white rust is described below.

When the surface of galvanized iron sheets comes into contact with air, there is an oxidization reaction and an extremely thin oxide film is formed. This oxide film acts as a protective film if the air is dry, however, if the air contains a lot of moisture and the galvanized iron sheets are left in that state for a long time, the carbon dioxide in the atmosphere will link up with the galvanizing via the moisture, resulting in the occurrence of powdery white rust. Generally speaking, white rust rapidly occurs as a result of condensation or water leakage, but white rust that occurs during storage in particular is almost always caused by condensation.

For this reason, the long-term storage of galvanized iron sheets should be avoided.

2-3 Basic Design

2-3-1 Design Concept

(1) Required Materials

Galvanized iron sheets are widely used for roofing purposes because their light weight makes transportation easy and their fitting requires no special technology. They cannot be described as a permanent roofing material, however, they can be said to be appropriate for the purposes of this housing improvement project because their cheap price makes it possible to spread the Project effect.

The request also includes G.T. screws with washers, which are used to fix the galvanized iron sheets onto roof crosspieces. However, for reasons of ease of fitting and resistance against corrosion, umbrella head nails like that shown in Figure 2-2 are generally used in Japan. Umbrella head nails shall be chosen for fixing down the galvanized iron sheets because they are

more suited than common nails in terms of supporting strength and resistance to corrosion.

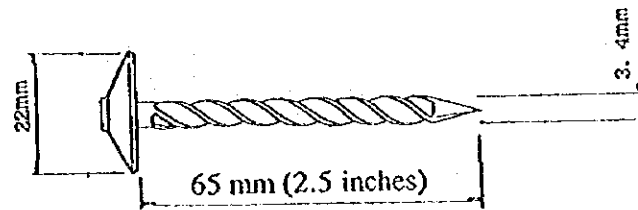


Figure 2-2 Dimension Drawing of Umbrella Head Nail

(2) Quantities of Materials

The local side has used the following data to work out that construction of one standard housing unit requires 35 corrugated galvanized iron sheets and three plain galvanized iron sheets, and these numbers are thought to be appropriate.

- ① Average floor area per house : 400 square-feet (approx. 37 m²)
- ② Average roof area per house : 650 square-feet (approx. 60 m²)
- ③ Average size of galvanized iron sheets : 26 inches x 10 feet (660mm x 3,048mm)
(2.17 feet x 10 feet = 21.7 square-feet)
- ④ Required sheets per house : 35 sheets (② ÷ ③) ÷ 30, 35 sheets with safety margin)

Moreover, it is considered that the three plain sheets are to be used as covers for roof ridge poles.

Furthermore, the request also includes 200 umbrella head nails per house, which works out to approximately six nails per corrugated sheet, and this is also considered to be the standard number.

From the above it works out that, in order to build 15,000 houses, 525,000 corrugated sheets, 45,000 plain sheets and 3,000,000 umbrella head nails will be required. Because galvanized iron sheets are normally bought and sold by weight and the weight of one is 8.90 kg (corrugated) and 8.54 kg (plain), it can be calculated that 4,673 tons of corrugated sheets and 384 tons of plain sheets will be required. Similarly, there are approximately 120 umbrella head nails per kilogram, so it works out that approximately 25 tons of nails will be needed. The detailed breakdown of the quantities of materials to be procured is shown in Table 2-3.

Table 2-3 Scheduled Procurement Quantities

Material	Q'ty Required per House	Target Number of Houses	Procurement Q'ty	
			Number	Weight
Corrugated G.I. Sheets	35 sheets	15,000 houses	525,000 sheets	4,673 ton
Plain G.I. Sheets	3 sheets		45,000 sheets	384 ton
Umbrella Head Nails	200 nails		3,000,000 nails	25 ton

(3) Method of Project Implementation

The final delivery of galvanized iron sheets to any beneficiary family shall be after satisfactory completion of superstructure (WPL) and when the roof framework is in progress. The supply of labor and other materials, etc. is planned as follows.

1) Financing for Labor and Other Materials

Those families with a monthly family income of no more than Rs. 700 shall be eligible to receive cash grant assistance and a commodity grant, the combined total of which shall be limited to Rs. 15,000 per family.

Those families with a monthly family income of between Rs. 700 to Rs. 2,500 shall be eligible to receive loan assistance in addition to a commodity grant, subject to their loan repayment capacity.

2) Contribution by the Beneficiary Families

Each beneficiary family shall provide family members to work as labor and, in cases where such labor cannot sufficiently be provided, each family shall make an alternative contribution in the form of money and/or materials.

In cases of very low income families, the support of the community and NGO shall also be mobilized.

The implementation and monitoring of the Project has been planned in the manner described below.

The National Housing Development Authority (NHDA) has a network of District Offices

which possess the necessary capabilities to implement the Project in the each targeted area, so Project implementation shall be the responsibility of these District Offices. Regarding the overall implementation and monitoring of the Project, this shall be the responsibility of the Rural Housing Development Division and the Urban Housing Development Division at the Head Office of the NHDA.

Furthermore, as part of the National Housing Development Plan (1995-1999), it is planned to establish at least one Housing Development Society (HDS) in each Divisional Secretariat Division as a means of mobilizing the community to participate in housing construction programs. It is also planned to establish one or more resource development centers under the supervision of the NHDA to produce and market building materials.

2-3-2 Basic Design

As a result of examination of the application form and requested contents, the following specifications of the materials are appropriate.

Material	Standards	Quantity	Purpose of Use
Corrugated G.I. Sheets	Standard: JIS G3302-1987 JIS G3316-1987 Material: SGCC and/or SGCH Corrugated sheet form: W1 (large wave) Sheet thickness: BWG26 Plating: Z18 Dimensions: Width 762 mm x length 3,048 mm	4,673 ton (525,000 sheets)	Roofing materials
Plain G.I. Sheets	Standard: JIS G3302-1987 Material: SGCC and/or SGCH Sheet thickness: BWG26 Plating: Z18 Dimensions: Width 914 mm x length 2,438 mm	384 ton (45,000 sheets)	
Umbrella head nails	Dimensions: Size 3.4 mm x length 65 mm	25 ton (3,000,000 nails)	Fixing of roofing materials

Chapter 3 Implementation Plan

3-1 Implementation Plan

3-1-1 Implementation Schedule

As the Project involves the procurement of only galvanized iron sheets and umbrella head nails, there shall be no consultant supervision. After the supplier that has been selected through tender has concluded a supply contract with the Government of Sri Lanka and the Government of Japan has verified the contract, the materials shall be manufactured, transported by sea to the landing port of Colombo and then handed over.

The schedule up until handing over of the materials is as follows.

Months		1	2	3	4	5	6	7	8	9	10	11	12
Overall Period	Tender (approx. 2 months)	Tender Work											
			Evaluation and Contract										
	Procurement (approx. 5 months)		Manufacturing and Procurement										
						Pre-shipment Inspection							
							Transportation						

3-1-2 Obligations of Recipient Country

As the Project is one involving the procurement of materials, the Government of Japan shall bear the equipment costs and the cost of materials transportation as far as Colombo Port. However, the Government of Sri Lanka shall bear the costs of customs clearance and bonded warehouse from Colombo Port and the cost of materials transportation to the target districts.

3-2 Operation and Maintenance Plan

As the Project only involves the procurement of construction materials, no maintenance costs will arise, however, Project operation costs are calculated as follows (Tables 3-1, 3-2).

Table 3-1 Financial Requirements

(Unit: Rs. Mln.)

Item	Numbers	Amount
Housing loans	25,000	750.0
Housing grant	10,000	150.0
Institutional development	--	50.0
Overheads	--	264.5
Total	35,000	1,214.5

Table 3-2 Funding Program

(Unit: Rs. Mln.)

Item	Amount
Internal generation	30.0
Contribution by the Community	21.0
Japanese grant aid	158.0
Sri Lanka Government	1,005.5
Total	1,214.5

Chapter 4 Project Evaluation and Recommendation

4-1 Project Effect

(1) Implementation of the Project will enable housing to be built for 15,000 low income households (with a monthly family income of no more than Rs. 2,500) in rural areas, cities and on plantations, and will thus improve the living environment for the beneficiaries concerned.

Improvement of the living environment will in turn lead to an increase in the desire to work among the beneficiary family members.

(2) Implementation of the Project will provide employment opportunities for skilled, semi-skilled and unskilled workers in the construction of the target houses.

4-2 Recommendation

(1) This Project is larger in scale than the previous two phases in terms of materials quantities and benefiting districts. The speedy distribution of the materials to the beneficiary families is required to not only achieve the early realization of the Project effect but also to maintain the quality of the galvanized iron sheets.

(2) It is desirable that the galvanized iron sheets be stored in appropriate conditions until delivery to ensure that white rust does not occur.

(3) Monitoring and prompt reporting to the Japan side of the distribution conditions including for the previously completed projects is required.

JICA