

**GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED**

GOVERNMENT OF INDIA

**THE PREPARATORY SURVEY
FOR DEDICATED FREIGHT CORRIDOR
(PHASE 2) (II)**

FINAL REPORT

MARCH 2012

**JAPAN INTERNATIONAL
COOPERATION AGENCY (JICA)**

NIPPON KOEI CO.,LTD.

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LOCATION MAP

The Preparatory Survey for Dedicated Freight Corridor (Phase 2) (II)

Final Report

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- 02: Final ESIA Report
- 03: Baseline Survey and Census Report
- 04: Full RRP Report
- 05: Fast-track RRP Report
- 06: Biweekly Report
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List of Abbreviation

BIS	:	Bureau of Indian Standard
BOD	:	Biological Oxygen Demand
BPL	:	Below Poverty Line
CA	:	Competent Authority
COD	:	Chemical Oxygen Demand
C/P	:	Counterpart
CPCB	:	Central Pollution Control Board
CPM	:	Chief Project Manager
CPR	:	Common Property Resources
DC	:	District Collector
DDP	:	Desert Development Programme
DFC	:	Dedicated Freight Corridor
DFCCIL	:	Dedicated Freight Corridor Corporation of India Limited
DF/R	:	Draft Final Report
DO	:	Dissolve Oxygen
DTEPA	:	Dahanu Taluka Environmental Protection Authority
EIA	:	Environment Impact Assessment
EMoP	:	Environment Monitoring Plan
EMP	:	Environment Management Plan
EMU	:	Environment Management Unit
ESCS	:	Environmental and Social Considerations Study
ESIA	:	Environmental and Social Impact Assessment
ESIMMS	:	Environmental and Social Impact Mitigation Measure Study
ESMMP	:	Environmental and Social Management and Monitoring Plan
FC	:	Forest Clearance
FCA	:	Forest Conservation Act
FD	:	Forest Department
FLS	:	Final Location Survey
F/R	:	Final Report
F/S	:	Feasibility Study
GDP	:	Gross Domestic Product
GHG	:	Greenhouse Gas
GLD	:	Guideline Design
GOI	:	Government of India
GOJ	:	Government of Japan
GRC	:	Grievance Redressal Committee
GRM	:	Grievance Redress Mechanism
HTT	:	High Tension Towers
ICD	:	Inland Container Depot
IMD	:	Indian Meteorological Department
IR	:	Indian Railways
JARTS	:	Japan Railway Technical Services
JBIC	:	Japan Bank for International Cooperation
JICA	:	Japan International Cooperation Agency
JNPT	:	Jawaharlal Nehru Port Terminal
JST	:	JICA Survey Team
JTCA	:	Japan Transport Cooperation Association
LA _E	:	Exposure Noise Level
LA _{eq}	:	Equivalent Noise Level
MDR	:	Major District Road

MLA	:	Member of Legislative Assembly
MoEF	:	Ministry of Environment and Forest
MOR	:	Ministry of Railways
NGO	:	Non Government Organization
NHA	:	National Highway Authority
NTU	:	Nephelometric Turbidity Units
OBC	:	Other Backward Caste
ODA	:	Official Development Assistance
ODR	:	Other District Road
PAF	:	Project Affected Family
PAH	:	Project Affected Household
PAP	:	Project Affected Person
PCM	:	Public Consultation Meeting
RAA	:	Railways (Amendment) Act
RAP	:	Resettlement Action Plan
RF	:	Reserved Forest
ROB	:	Road Over Bridge
ROW	:	Right of Way
R&R	:	Resettlement and Rehabilitation
RRP	:	Resettlement and Rehabilitation Plan
RUB	:	Road Under Bridge
SC	:	Scheduled Caste
SEMU	:	Social and Environmental Management Unit
S-ESIMMS	:	Supplemental ESIMMS
SGNP	:	Sanjay Gandhi National Park
SH	:	State Highway
SIA	:	Social Impact Assessment
SPCB	:	State Pollution Control Board
SPV	:	Special Purpose Vehicle
SR	:	Sensitive Receptor
ST	:	Scheduled Tribe
STEP	:	Special Terms of Economic Partnership
TDS	:	Total Dissolved Solid
TKD	:	Tuglakabad
TOR	:	Term of Reference
TSS	:	Total Suspended Solid
VM	:	Village Meeting
WB	:	World Bank
WHO	:	World Health Organization
WLS	:	Wildlife Sanctuaries
WPA	:	Wildlife Protection Authority

Exchange Rates

USD 1.00 = JPY 80.48

INR 1.00 = JPY 1.630

(JICA Exchange Rates as of March 2012)

PART I GENERAL

PART I GENERAL

CHAPTER 1 INTRODUCTION

1.1 BACKGROUND

The Indian Railways constitutes a critical component of India's transport network, both for passenger as well as freight services. It is the fourth busiest railway in the world in terms of total traffic units carried.¹ Though railways are cost effective and also environment friendly, capacity and efficiency constraints in the freight segment have, over the years, led to a significant shift from railways to road transport. Road transport which saw an increase in investments since the late 1990s, advanced more rapidly than railways, and now accounts for about 65% of the freight market and 90% of the passenger market in India, and those shares are growing. However, increases in the price of oil, with its associated energy security issues and escalating concerns about greenhouse gas (GHG) emissions, has put an emphasis on developing a low-carbon infrastructure and an energy efficient transport system. Considering the ever increasing freight traffic movement between the metros and their respective hinterlands, Indian Railways has initiated the development of Dedicated Freight Corridors (DFC) in the country. The implementation of the DFC is expected to generate two major impacts on the freight movement within the country: the shift of freight from road to the low-carbon intensive rail transport mode and an inherent improvement in energy efficiency of freight rail through adoption of improved technologies. At the same time, this will restore the railways' competitive edge in the market.

The four routes that form a Golden Quadrilateral connecting Delhi, Mumbai, Chennai and Kolkata account for 16% of the railway network's route length, but they carry more than 60% of India's total rail freight. The existing trunk routes of Mumbai-Delhi on the Western Corridor and Kolkata-Delhi on the Eastern Corridor are highly saturated with capacity utilization varying between 115 to 150%. Surging power needs requiring heavy coal movement, booming infrastructure construction and growing international trade has initially led to the approval of the DFC along the Western and Eastern Routes by the Government of India to fulfil the demand of additional capacity for rail freight transportation. In the Twelfth Five-Year Plan (2013-2018), the Planning Commission, of the Government of India has set an infrastructure investment target of US\$1 trillion. This is approximately 9-10% of expected Gross Domestic Product (GDP). Augmentation of transport systems, particularly of the rail network, will play a crucial role in this infrastructure development and hence, support India's growing economy, which is currently at the second fastest in the world.

Under these circumstances, the Ministry of Railways (MOR) established the Dedicated Freight Corridor Corporation of India Limited (DFCCIL), a Special Purpose Vehicle (SPV), to undertake planning and development, mobilization of financial resources, and construction, maintenance and operation of the DFC. DFCCIL was incorporated as a company under the Companies Act 1956 on the 30th of October 2006. This company is now actively engaged in the implementation of the Computerized Multi Modal High Axle Load Dedicated Freight Corridor Project between Delhi and Mumbai under the Western DFC Corridor and Ludhiana-Delhi-Kolkata under the Eastern DFC Corridor.

As planned, the Western DFC is designed to carry a total freight line of 37.7 million tonnes in fiscal year 2013-2014, which would increase to 140.4 million tonnes in 2033-34.

¹ Traffic Units are passengers-km plus freight ton-km

The Western DFC has two broad streams of traffic, one, between the terminal nodes at either end, Jawaharlal Nehru Port Trust (JNPT) in Mumbai and Dadri in Uttar Pradesh including Tuglakabad in Delhi, and the other, the traffic entering from branch line feeder routes at the various junction points en route. Creation of rail infrastructure on such a scale, unprecedented in independent India, is also expected to drive the establishment of industrial corridors and logistic parks along its alignment. The Western DFC will mainly cater to containers, fertilizer, POL², coal, salt and cement. The Corridors have been planned with an axle load of 32.5 tonnes for bridges and sub-structures and 25 tonnes for track structure with a design speed of 100 km/h. Predominantly, double line corridor (except where single line is justified on traffic considerations) is planned with electrification and advanced signalling system. Implementation of the DFC Projects will result in reducing the carbon intensity of India's transport sector. The GHG emissions under DFC scenario will be primarily coming only from electricity consumption in locomotives during freight movement and fossil fuel and electricity usage in support infrastructure of DFC.

The Western Corridor has been divided into 2 phases, in which Phase 1 covers corridor between Vadodara and Rewari and Phase 2 includes JNPT in Mumbai - Vadodara and Rewari - Dadri as well as a single line from DFC mainline near Faridabad to Tuglakabad (Figure 1.1). The Western Corridor is being funded by JICA for a total length of 1,483 km. It is planned that construction work will be completed in 4-5 years between 2012 and 2016. Commercial operation is planned to be started from December 2016.

Under the "Joint Statement on the Advancement of the Strategic and Global Partnership between India and Japan" signed by the Prime Ministers of India and Japan in October 2008, based on the "Feasibility Study on Dedicated Freight Corridor Project" conducted JICA in 2006-2007 (JICA F/S), the two Prime Ministers reaffirmed their commitment to the realization of the Western Corridor of the DFC Project as the new flagship project of Japan-India cooperation by utilizing the Japan's Special Terms of Economic Partnership (STEP) scheme, and the loan provision for the Phase 1 section was agreed by both countries in March 2010.

Both Prime Ministers have expressed their commitment for early assistance provision in the entire Western Corridor, and to achieve earlier realizing on the rest of the Western Corridor (the total length of 565 km consisting of Rewari-Dadri total 145 km and JNPT-Vadodara 420 km), the JICA Preparatory Survey for DFC Project (Phase 2) was conducted in February 2010. In the survey, the preparation of the Environment and Social Impact Assessment (ESIA) and Rehabilitation and Resettlement Plan (RRP), and organization of Public Consultation Meetings (PCMs) on the ESIA and RRP were identified as required tasks after reviewing the JICA F/S and project preparation. Therefore, the Preparatory Survey aims at assisting the Government of India to confirm environmental and social considerations, prepare the ESIA and RRP reports and conduct the PCMs on ESIA and RRP for the DFC Phase 2 section (see Attachment I.1.1).

² POL: It refers to all products related to Petroleum, Oil and Lubricants

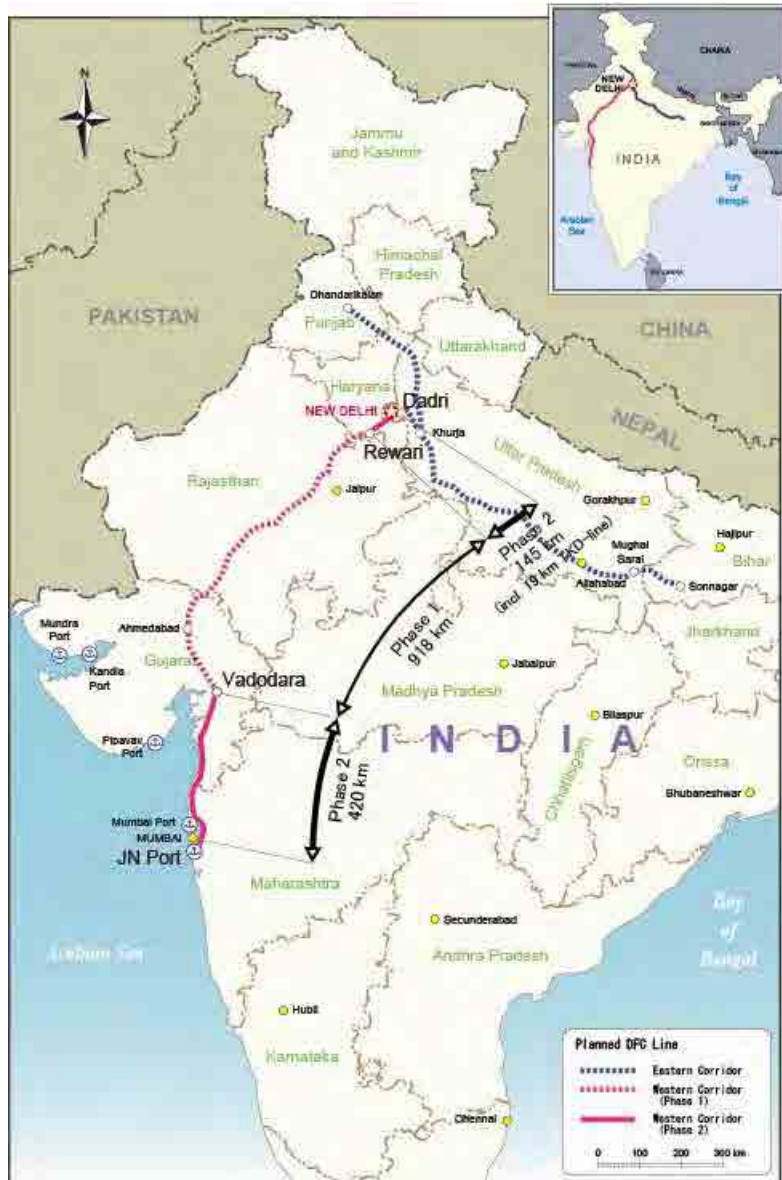


Figure 1.1 Phased Implementation Map of DFC Western Corridor

1.2 SURVEY OBJECTIVE

The survey objective is to confirm the progress of the environmental and social considerations work (preparation of ESIA and RRP, and organizations of the PCMs for both ESIA and RRP separately) in the Phase 2 section, namely the preparation of the ESIA and RRP reports in accordance with international standards such as the Ex-JBIC Guidelines for Confirmation of Environmental and Social Considerations (April, 2002, Ex-JBIC Guidelines) and the World Bank Operational Policy to formulate a Japanese yen-loan project in an appropriate and prompt manner.

1.3 SURVEY AREA

Phase 2 of the DFC Western Corridor between JNPT-Vadodara and Rewari-Dadri passes through two districts in Maharashtra, five districts in Gujarat, five districts in Haryana, one district in Rajasthan, and one district in Uttar Pradesh. In addition, a single line connection

(called as “TKD” line) of 19 km long is to be branched out from the DFC mainline near Faridabad District to Tuglakabad area of Delhi. The affected project areas along with the length of alignment are shown in Table 1.1 and Figures 1.2 - 1.3 (see Attachment I.1.2).

Table 1.1 Affected Areas of Phase 2 of the DFC Western Corridor

Section	State	Districts	Length of Alignment
JNPT-Vadodara	Maharashtra	Thane, Raigad	420 km
	Gujarat	Vadodara, Bharuch, Surat, Navasari, Valsad	
Rewari-Dadri (including TKD line)	Rajasthan	Alwar	145 km including TKD: 19 km
	Haryana	Faridabad, Gurgaon, Rewari, Palwal, Mewat	
	Uttar Pradesh	Gautam Buddh Nagar	
	Delhi	Tuglakabad	

Source: JICA Survey Team



Source: JICA Survey Team

Figure 1.2 Location of the JNPT to Vadodara Section



Source: JICA Survey Team

Figure 1.3 Location of the Rewari to Dadri Section

Nearly 70% of the alignment length in JNPT-Vadodara section has been kept parallel to the existing railway lines. The alignment from Mahim Junction Station to Vasai Road Station had two possibilities; one was along the existing sea side route, another was along the east inland route. Although the route passes close to the Sanjay Gandhi National Park (SGNP), the inland route was planned because there are highly crowded urban residences along the existing railway line which do not allow enough ROW for the DFC and it is necessary to avoid large sized the involuntary resettlement. Meanwhile, it is entirely on a new alignment route from Rewari to Dadri. For providing connection to Tuglakabad ICD, a single TKD line is partly on detour route and partly parallel to the existing Delhi-Mathura line.

Some basic information on key parameters pertaining to the natural and social environment in Phase 2 of the DFC Western Corridor is shown in Table 1.2.

Table 1.2 Natural and Social Environment along Phase 2 of the DFC Western Corridor

	Rewari -Dadri	JNPT-Vadodara
Affected States (No. of Affected Villages* by District)	(1) Uttar Pradesh: 11 villages in Gautam Budh Nagar District; (2) Haryana: 81 villages in Rewari, Mewat, Palwal, Gurgaon and Faridabad Districts; (3) Rajasthan: 13 villages in Alwar District	(1) Gujarat: 133 villages in Valsad, Navsari, Surat, Bhauch and Vadodara Districts; (2) Maharashtra: 136 villages in Raigad and Thane Districts).

	Rewari -Dadri	JNPT-Vadodara
Recorded Forest Area and Protected Area	(1) DFC passing near the reserved forest on foothill of Aravalli Hill in Mewat District towards Sohna side in Gurgaon; (2) DFC passing for nearly 1.5 km within reserved forest in Gautam Buddh Nagar District, Uttar Pradesh.	(1) DFC traversing through nearly 20 small forest patches in recorded forest areas in Thane District; (2) DFC passing through three to four mangrove areas in Thane District; (3) DFC passing within the buffer area (Reserved Forest) and near the range boundary of the Sanjay Gandhi National Park in Thane District; (4) DFC passing within the buffer area but away from the range boundary of the Tungreshwar Wildlife Sanctuary in Thane District.
Legally Protected Eco-sensitive Area	(1) DFC passing a geo-physical sensitive area near Aravalli Hill Range in Alwar District in Rajasthan and Mewat District in Haryana.	(1) DFC traversing through ecologically fragile Dahanu area of Thane District in Maharashtra.
Important Rivers	(1) DFC crossing Yamuna River at the border between Faridabad District, Haryana and Gautam Buddh Nagar District, Uttar Pradesh; (2) DFC crossing Hindon River in Gautam Buddh Nagar District, Uttar Pradesh.	(1) Thane District, Maharashtra State: a) South Vaitarna River, b) North Vaitarna River, and c) Ulhas River; (2) Valsad District, Gujarat State: a) Daman Ganga River, b) Par River, and c) Auranga River; (3) Navsari District, Gujarat State: a) South Kaveri River, b) North Kaveri River, c) Ambika River, d) N. Poorna River, and 5) Mindhola River; (4) Tapi River in Surat District, Gujarat; (5) Narmada River in Bharuch District, Gujarat.

Note: See Attachments I.1.3 and I.1.4.

Source: Final Report of the Preparatory Survey for Dedicated Freight Corridor (Phase 2) (February 2010) and Environmental and Social Impact Mitigation Measures Study (ESIMMS) (2007-2008) and as amended on the basis of ESIA Survey (2010-2011)

1.4 SCOPE OF THE SURVEY

Scope of the Preparatory Survey is shown below.

(1) Preparation and Submission of the Inception Report

- 1) Confirm the background, approach, scope, schedule, and important points for the survey by meeting with relevant sections of JICA;
- 2) Examine the survey approach, survey items, survey methodologies, and survey plan;
- 3) List all necessary data to be collected for the survey, and prepare and send questionnaire to the project implementation body;
- 4) Prepare an Inception Report detailing the basic approach of the survey, survey implementation organization, survey plan including survey methodology and survey schedule, and submit the Inception Report to JICA for review;
- 5) Hold a meeting with JICA India Office in the commencement of the survey to discuss and confirm the Inception Report. If there are any comments, the Inception Report shall be revised as per the comments. Then, the Inception Report shall be explained to the project implementation body and relevant agencies.

(2) Support for preparation of Environmental and Social Impact Assessment (ESIA) Report

- 1) Review of existing studies
 - a) Review “The Feasibility Study on Dedicated Freight Corridor Project (February 2007)” and “The Preparatory Survey on Dedicated Freight Corridor Project (Phase 2) (I) (February 2010)”;
 - b) Review the latest DFC alignment through the F/S for the DFC Phase 2 section, which was prepared by DFCCIL, and review other relevant information on project-related environmental issues, especially underground water study near the Aravalli range through field reconnaissance and secondary information collection.
- 2) Preparation of ESIA report as per the Ex-JBIC Guidelines
 - a) Confirm the basic information on environmental situations such as land use, natural environment, and socio-economy;
 - b) Confirm data on institution and organizations related to the environmental and social considerations
 - i) Legislations and standards on environmental and social considerations such as ESIA, resettlement, public participation, information disclosure, and gender balance;
 - ii) Preparation of ESIA report as per the Ex-JBIC Guidelines;
 - iii) Roles of relevant organizations such as Competent Authority and CPM office;
 - c) Implement environmental scoping to clarify environmental and social items to be considered and assessment methodologies for implementation of the project;
 - d) Forecast environmental impacts due to the project;
 - e) Conduct impact evaluation and alternative analysis including zero option;
 - f) Study measures to avoid/minimize/mitigate the environmental impacts;
 - g) Prepare an environmental monitoring plan including implementing structure and methodology;
 - h) Support in preparing an environmental check-list.
- 3) Support for holding a PCM for environmental scoping and draft ESIA report preparation
 - a) Support for implementation and record taking in the public consultation meetings to be held in the environmental scoping and draft ESIA report preparation, with gender balance considerations to reflect the opinions of women. Results of the meeting shall be reflected in the ESIA report.

(3) Support for Preparation of RRP

- 1) Support for the preparation of RRP to meet requirements of the “Resettlement Plan” in Annex 1 of the World Bank Operational Policy 4.12 as per the Ex-JBIC Guidelines.
 - a) Confirm the legal framework on resettlement;
 - b) Confirm the project purpose and reason why resettlement is required;

- c) Study the project extensively to avoid or minimise resettlement;
 - d) Implement baseline surveys including population census, socio-economic survey, and asset inventory including socially vulnerable persons such as female-headed households;
 - e) Examine definition of the PAP to be resettled and entitlement for compensation and support;
 - f) Examine estimation method for lost assets and compensation method for lost assets;
 - g) Examine concrete measures for compensation and support;
 - h) Examine grievance redress mechanism;
 - i) Examine implementing organization;
 - j) Examine implementation schedule;
 - k) Examine cost estimate and budgeting plan;
 - l) Examine methods of monitoring and evaluation. Monitoring items shall include gender-related item.
- 2) Support for holding PCM
 - a) Support for holding PCMs for the preparation of the RRP, with gender balance considerations to reflect the opinions of women.
- (4) Review the implementation of Land Acquisition and Resettlement in Both Phase 1 and Phase 2 Sections of DFC Project**
- 1) Review results of internal and external monitoring in the DFC Phase 1 section,
 - 2) Review progress of land acquisition and resettlement process in the DFC Phase 2 section, and
 - 3) Evaluate the progress on computation of the replacement cost compensation and supports for livelihood recovery.
- (5) Suggestions on Implementing Organization for Environmental and Social Considerations under the Project Implementation Body**
- 1) Review the present capability of SEMU and CPM offices
 - 2) Identification of issues on SEMU and CPM offices
 - 3) Proposal on institutional framework in each project stage
 - 4) Preparation of TOR for potential supportive bodies such as NGOs
- (6) Preparation of Draft Final Report**
- 1) Prepare Draft Final Report by reflecting the survey items above,
 - 2) Explain the Draft Final Report to the relevant organizations connected with the project in India, have discussions, and give consent regarding the contents of the report. If there are any comments regarding the report, it would be reflected during the finalization of the report after discussions with JICA.
- (7) Preparation of Final Report**
- 1) Examine further information collected in Japan,

- 2) Prepare Final Report after examining and reflecting comments from Indian side and JICA. The Final Report will be submitted to JICA.

1.5 OVERALL SURVEY SCHEDULE

Initially the survey was planned to be conducted between August 2010 and March 2011 for a total duration 8 months. However, the survey period was extended until March 2012 after modification of the contract between JICA and Nippon Koei Co., Ltd. due mainly to the difficult situations encountered during the Baseline Survey and Census with regards to the local social situation such as resentment by the project affected peoples (PAPs). Actual implementation schedules for ESIA and RRP reports preparation are shown in Table 1.3.

Table 1.3 Actual Implementation Schedules for ESIA and RRP Preparation

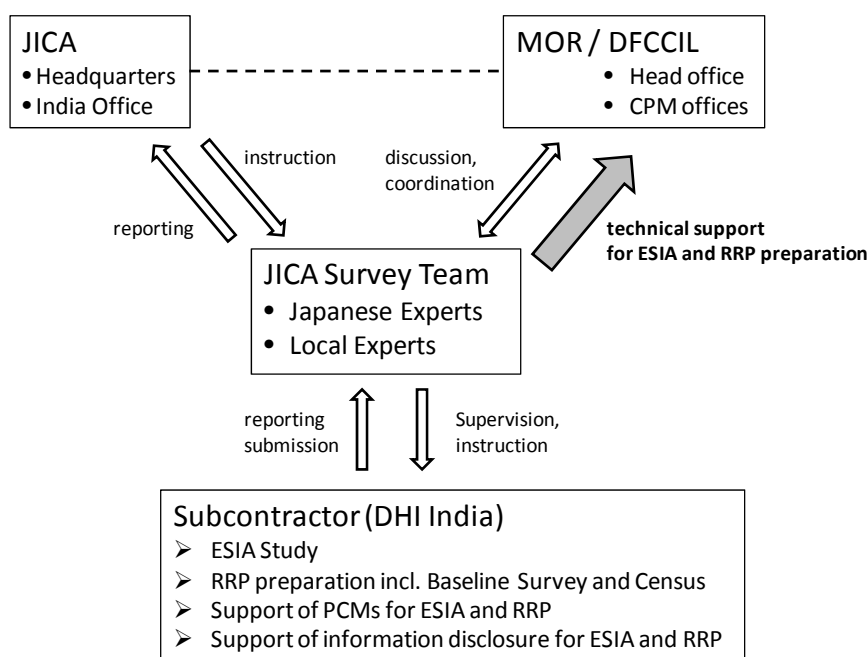
	2010					2011												2012		
	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
1. Support of ESIA Preparation																				
(1) Review of previous studies	■																			
(2) Collection of secondary information	■																			
(3) Review of legal institutions on environmental and social considerations in India	■																			
(4) ESIA scoping and preparation of draft TOR for ESIA study		■																		
(5) Procurement procedure of subcontractor for the ESIA study		■	■																	
(6) Implementation of PCM for environmental scoping				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
(7) Finalization of TOR					■															
(8) Implementation of ESIA Study (Field survey and impact analysis)				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
(8)-1 Natural Environment (Flora & Fauna) survey				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
(8)-2 Water quality baseline survey				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
(8)-3 Sensitive Receptors and Landuse Survey				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
(8)-4 Noise & Vibration survey				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
(8)-5 Geology & Groundwater survey (preliminary survey)				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
(9) Impact analysis and comparative analysis of the alternatives										■	■	■	■	■	■	■	■	■	■	■
(10) Examinations on mitigation measures										■	■	■	■	■	■	■	■	■	■	■
(11) Preparation of EMoP and EMP										■	■	■	■	■	■	■	■	■	■	■
(12) Preparation of Draft ESIA report													■	■	■	■	■	■	■	■
(13) Review of Draft ESIA report by MOR/DFCCIL and JICA													■	■	■	■	■	■	■	■
(14) Implementation of PCM for Draft ESIA report													■	■	■	■	■	■	■	■
(15) Preparation of environmental checklist as per JICA guidelines													■	■	■	■	■	■	■	■
(16) Dissemination of Draft ESIA report													■	■	■	■	■	■	■	■
(17) Collection of comments on Draft ESIA report													■	■	■	■	■	■	■	■
(18) Finalization of ESIA report													■	■	■	■	■	■	■	■
(18-1) Printing Final ESIA report (50 sets) and Summary (10,000 sets)													■	■	■	■	■	■	■	■
(19) Dissemination of Final ESIA report and Summary													■	■	■	■	■	■	■	■
(20) Approval of Final ESIA report by DFCCIL/MOR													■	■	■	■	■	■	■	■
(21) Dissemination of Final ESIA report in JICA (120 days to L/A)													■	■	■	■	■	■	■	■
2. Support for RRP Preparation																				
(1) Review of legal institution on land acquisition and resettlement	■																			
(2) Examination of avoidance and minimization of resettlement	■																			
(3) Collection of basic information on land acquisition	■																			
(4) Review of progress/practice on land acquisition and resettlement in Phase 1 section	■																			
(5) Review of status of land acquisition in Phase 2 section	■																			
(6) Preparation of TOR for Baseline Survey and Census and RRP	■																			
(7) Procurement procedure of subcontractor for the ESIA study		■	■																	
(8) Implementation of the Baseline Survey and Census						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
(9) Compilation and analysis of the Baseline Survey and Census Preparation of fast track RRP						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
(10) Finalization of Entitlement Matrix (Definition of resettles and methods of compensation and support)														■	■	■	■	■	■	■
(11) Preparation of draft RRP														■	■	■	■	■	■	■
(12) Review of draft RRP by JICA and MOR/DFCCIL														■	■	■	■	■	■	■
(13) Implementation of PCM for draft RRP														■	■	■	■	■	■	■
(14) Dissemination of Draft RRP report														■	■	■	■	■	■	■
(15) Collection of comments on Draft RRP report														■	■	■	■	■	■	■
(16) Finalization of RRP														■	■	■	■	■	■	■

Source: JICA Survey Team

1.6 SURVEY ORGANIZATION

(1) Survey Organization

The organization for the Preparatory Survey is shown in Figure 1.4. The JICA Survey Team (JST) consisted of Japanese and local experts. The JST also contracted with DHI (India) Water & Environment Pvt Ltd, New Delhi as a local consultant who undertook the actual field survey and various arrangements such as PCM and information disclosure at the fields.



Source: JICA Survey Team

Figure 1.4 Organization of the Survey

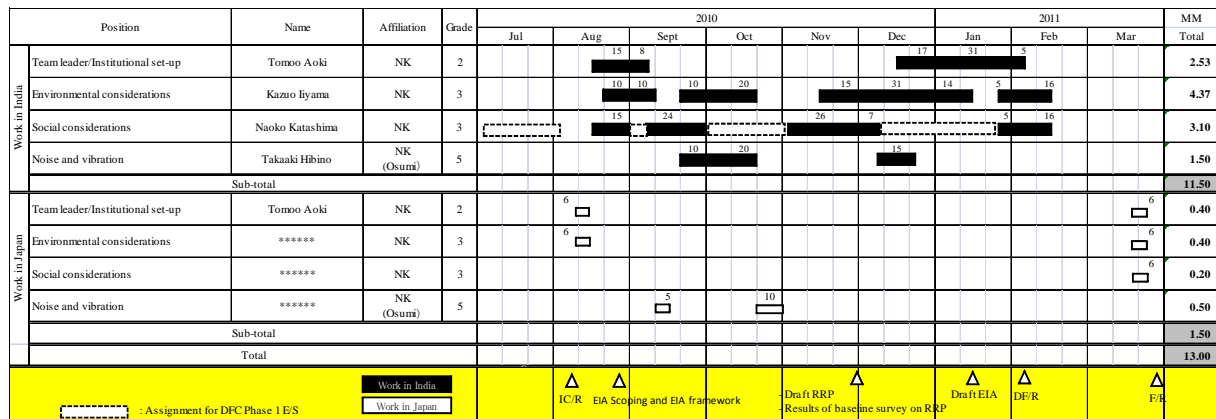
(2) Assignment of JICA Survey Team Members

In the commencement of the survey, Japanese experts of the JST were four and they were assigned as shown in Figure 1.5. However, actual assignment schedule for the JST is shown in Figure 1.6. Due to difficulties encountered during the survey, especially for the Baseline Survey and Census with regards to the local social situations, some additional experts were assigned during the survey.

As for the local experts, the experts shown in Table 1.4 were assigned for the survey.

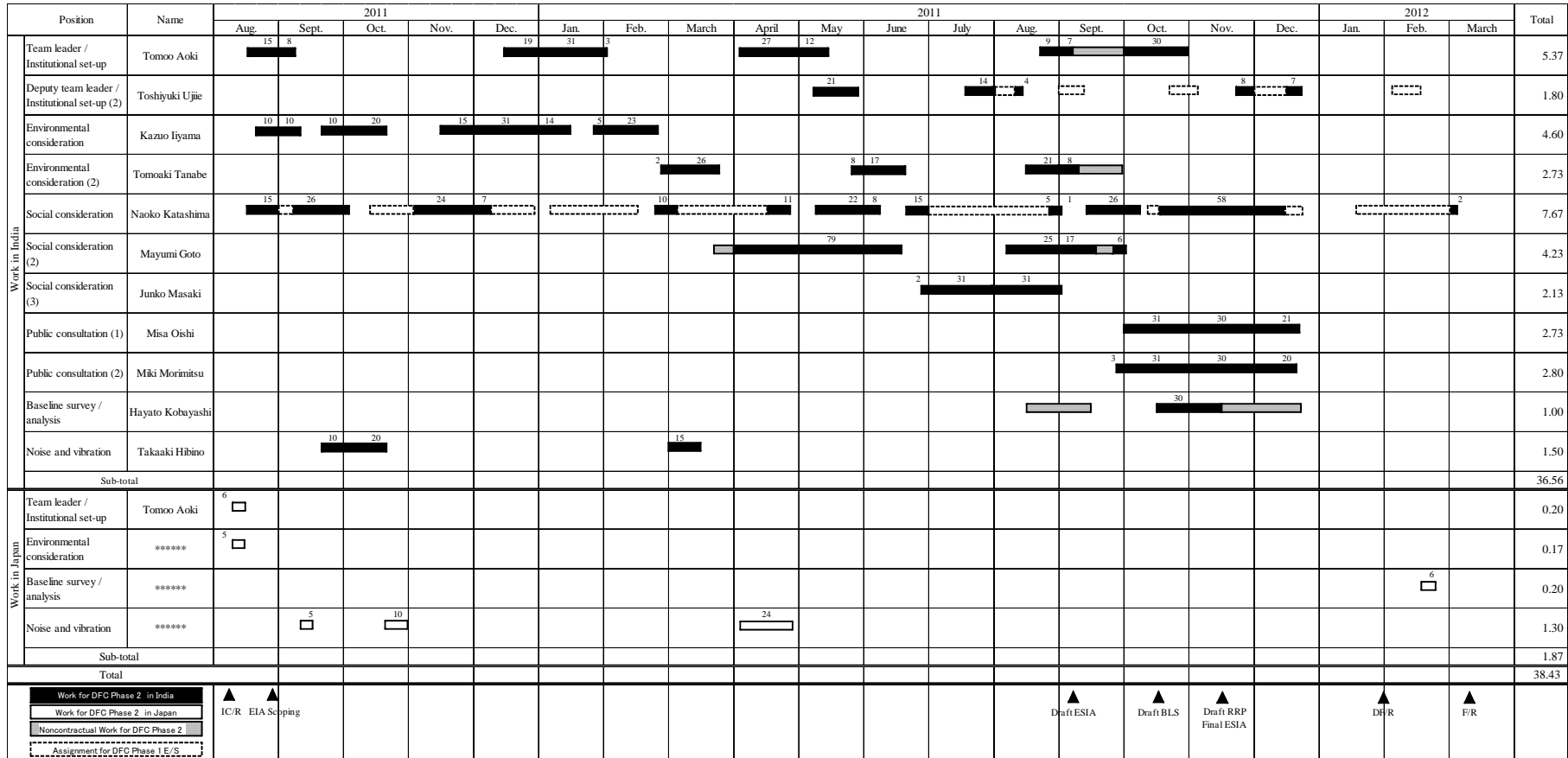
Table 1.4 Assigned Local Experts for the Survey

Specialty	Name
(1) ESIA	Mr. Ajay Gupta
(2) Natural environment	Mr. S. Feizi
(3) Natural environment (Supplemental survey)	Dr. Archana Godbole
(4) Natural environment (Supplemental survey) (2)	Ms. Jayant Sarnaik
(5) Pollution control	Mr. Manohar Kumar
(6) Social environment / RRP	Mr. Suchit Singh / Mr. Prasanta Kumar Sahu / Dr. Bhattacharya Debasish
(7) Public consultation	Mr. Sanjeev Pandey
(8) Public consultation (2)	Dr. Syed Asad Akhtar
(9) Geology / Underground water	Dr. S.K. Sharma
(10) Assistants for noise/vibration survey	-



Source: JICA Survey Team

Figure 1.5 Initial Assignment Schedule for the JICA Survey Team (Japanese Experts)



Source: JICA Survey Team

Figure 1.6 Actual Assignment Schedule for the JICA Survey Team (Japanese Experts)

CHAPTER 2 APPROACH TO THE SURVEY

Based on the previous experiences in “The Feasibility Study on Dedicated Freight Corridor Project (February 2007)” and “The Special Assistance for Project Formation (SAPROF) in connection with DFC Project in India (January 2009),” it was recognized that the survey aimed at implementation of appropriate environmental and social considerations would be able to work in an effective and efficient manner for prompt realization of the DFC Project (Phase 2) by utilizing the project proponent’s knowledge and experience in environmental and social considerations gained from past DFC studies.

2.1 TECHNICAL APPROACH

(1) Implementation of the Survey by Scoping of Environmental and Social Impacts on the Finalized DFC Alignment

The DFC Project has been studied and planned since the JICA F/S in 2007. It seems that several sections were changed from the originally suggested alignment in the JICA Surveys based on the village names in the 20A Notification issued in the official land acquisition procedure. Moreover, in the Preparatory Survey for DFC Project (Phase 2) which was conducted in 2009-2010, it was identified that some alignment changes were found in the detour sections at Kunde Vahal detour section, Panvel detour section, Nilije-Kopar Road Diva detour section, Navsari section and Rewari-Dadri section in comparison to the guideline design suggested in the JICA F/S. Thus, during the first work in Japan in August 2010, the JST prepared a questionnaire form, sent it to DFCCIL before the first field survey and confirmed the final alignment with DFCCIL during the early stage of the first field survey. Based on the final alignment of the Phase 2 section, scoping of the environmental and social impacts of the project would be conducted using the existing data and the site visit results, and the proposed survey plan would be refined with the scoping results.

Moreover, the alignment in the Phase 2 section was under study by the Chief Project Manager offices (CPM offices) as DFCCIL local office (Mumbai, Surat, Vadodara and Noida for the Phase 2 section). The alignment of the Phase 2 section was being technically reviewed by the Engineering Service (E/S) Team for the Phase 1 section in consultation with CPMs. Therefore, the JST would joined the review and discussions between CPMs and the E/S Team on critical issues in terms of environmental and social considerations such as (1) tunnels/a deep cut area, (2) protected areas and recorded forest areas, (3) affected communities in the detour sections and (4) densely populated areas in the parallel sections to conduct the survey efficiently.

(2) Technical Assistance to be Provided to DFCCIL to Strengthen Units in Charge of Environmental and Social Considerations of the Phase 2 Section during Construction and Operation

In the survey, the JST would discuss with DFCCIL the organizational structure in charge of environmental and social considerations work at the DFCCIL CPM Offices and Head Office so that the environmental and social considerations work would be conducted in an appropriate manner. During the previous SAPROF survey, the Social and Environmental Management Unit (SEMU) was established in accordance with a request from JICA. Although the unit has one General Manager, one Assistant General Manager, one Environmental Expert and one Social Expert, the SEMU needed to be strengthened to supervise the extensive project implementation such as implementation of mitigating measures and monitoring proposed in the ESIA report, supervision of the baseline survey

implementation and review of the survey results, implementation of land acquisition, resettlement and rehabilitation by CPM offices in accordance with the RRP report.

Thus, the proposal to further strengthen the organizations in charge would be prepared by the JST based on the discussions with DFCCIL, and the capacity building assistance would be provided by the JST.

(3) Collaboration with the E/S Team for the Phase 1 Section

Since June 2010, the E/S of the Phase 1 for the DFC Project has commenced, and Nippon Koei Consortium (NKC) dispatched various experts for the consultation works as the prime company of the consortium. Within the E/S, the Final Location Survey (FLS) alignment of the Phase 2 section has been reviewed by the E/S Team in the beginning of the Preparatory Survey.

Since the alignment finalization was critical to be able to conduct the Preparatory Survey in the limited survey period, the Preparatory Survey would be conducted based on the finalized alignment in consultation with the E/S Team to avoid unnecessary work or delay in the survey. More specifically, after the first field work was started in mid-Aug. 2010, the JST planned to confirm the alignment review status with the E/S Team, to prepare the draft scoping, the Terms of References (TOR) of the sub-contracted work (i.e. ESIA, RRP and PCMs) and the draft Inception Report (IC/R) of the Preparatory Survey and to confer with the relevant officers of DFCCIL in order to facilitate the Preparatory Survey.

During the first field survey, the JST will work closely with the E/S Team for alternative considerations to minimize environmental and social impacts which is one of the requirements of the ESIA in accordance with the Ex-JBIC Guidelines.

(4) Utilization of the Past Survey Results and the draft RRP prepared by the Project Proponent

It is planned that the RRP will be prepared efficiently by utilizing the existing data prepared by the CPMs to identify PAPs such as the resettlers and affected landowners. In the Phase 2 section, and land acquisition process, Notifications 20A and 20E, has been implemented in accordance with the Railways (Amendment) Act (RAA) 2008. Additional field surveys to identify the land plot boundary were conducted by the CPMs.

As for compensation and livelihood restoration programs, the draft RRP prepared in the previous SAPROF Survey would be reviewed and adopted for the Phase 2 DFC Project. Specifically, the entitlement matrix of the Phase 1 section which was already agreed between DFCCIL and JICA shall be adopted for the RRP for Phase 2 section to avoid any discrepancy in the compensation package of the DFC Project for the different sections.

2.2 OPERATIONAL APPROACH

(1) Japanese /Indian Experts Experienced in Relevant Projects

Nippon Koei Co., Ltd. has conducted the past surveys of the DFC Project such as the F/S, SAPROF Survey and E/S and also has experienced Japanese experts and adequate information and understanding of the Project. Thus, in the Preparatory Survey, the Japanese/Indian experts who were involved in the past surveys or have adequate experience in the relevant project were allocated. Most Japanese experts of the JST joined the previous DFC study/studies and are already familiar with the geographical and

social conditions of the project site. As for the Indian experts, those who were involved in the previous surveys were designated as much as possible.

(2) Preparation of ESIA & RRP and Organization of PCMs by the Local Sub-Contractor

The sub-contracted work was very extensive and challenging since it consisted of various components; namely (1) ESIA report, (2) RRP report, (3) Baseline and Census Survey including the census, inventory of the affected assets and socio-economic survey, and (4) PCMs for the wider survey area of approximately 565 km and having a tight deadline which was March 2011. To conduct the extensive work by the given deadline, the sub-contracted work was conducted by a local consultant which has adequate manpower and expertise in various fields such as social considerations, fauna and flora, water quality, noise and vibration, air quality and geology, rather than hiring individual experts.

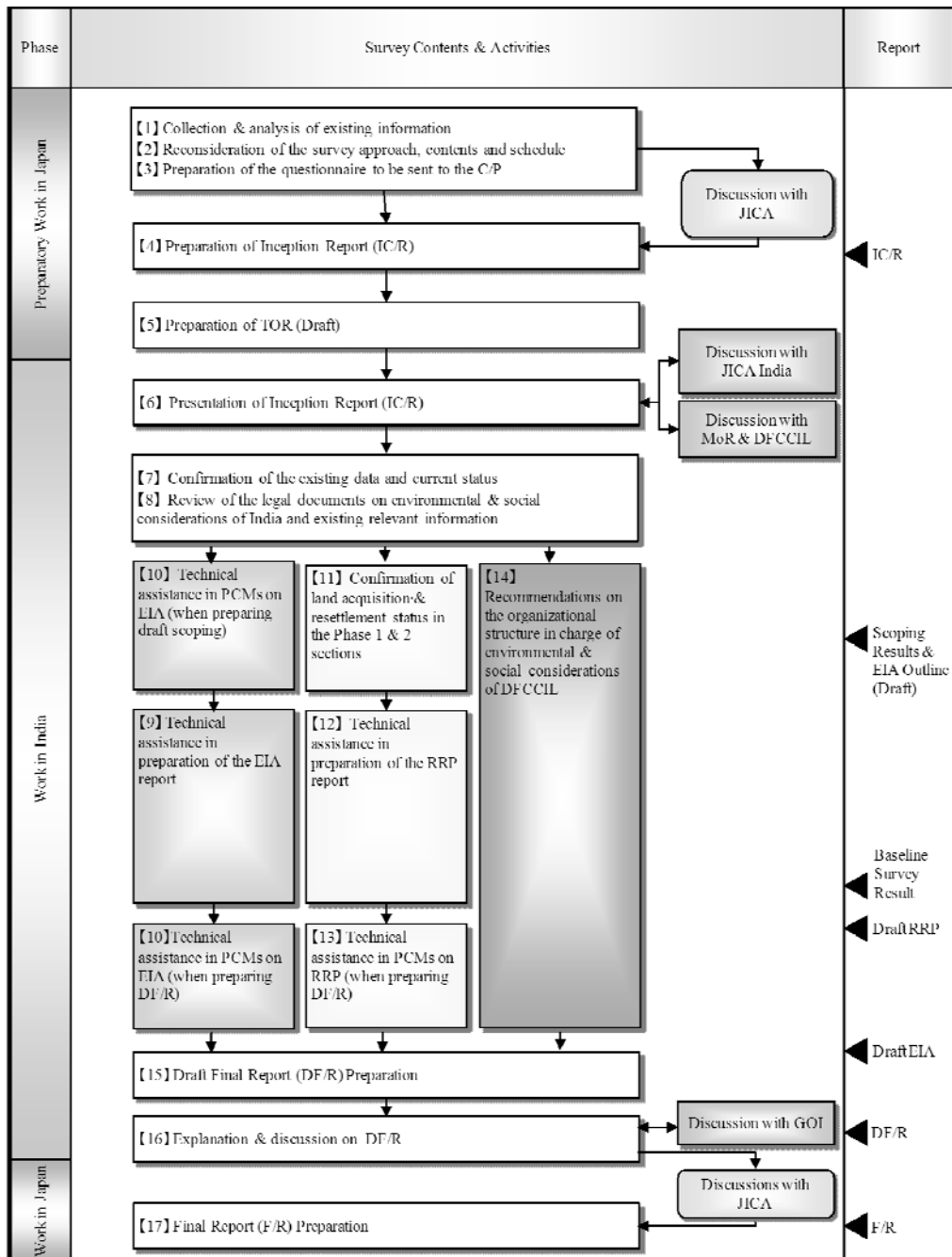
(3) Security Information Collection and Emergency System

The JST communicated regularly with JICA India Office and MOR/DFCCIL to obtain the latest security information. For emergencies, the emergency contact list and the manual will be provided to the JST.

CHAPTER 3 METHODOLOGY OF THE SURVEY

3.1 OVERALL FRAMEWORK OF THE SURVEY

The overall activities of the survey are shown in Figure 3.1.



Source: JICA Survey Team

Figure 3.1 Flow of the Survey Activities

3.2 OVERALL METHODOLOGY OF THE SURVEY

3.2.1 Preparatory Work/1st Home Work in Japan (August 2010)

(1) Collection & Analysis of Existing Information

The previous surveys, namely “The F/S on DFC Project (February 2007)” and “The SAPROF in connection with DFC Project in India (2009)” were reviewed and utilized to fast-track the Survey since this survey needs to be conducted in line with the results of previous environmental and social considerations in the Phase 1 section.

(2) Reconsideration of the Study Approach, Contents and Schedule

Considering the background and characteristics of the Project, the JST refined the initially proposed study approach, contents, items, activity plan based on available information and discussions with JICA/MOR/DFCCIL.

(3) Preparation of the Questionnaire to the C/P

Since there was a possibility that DFCCIL has started certain ESIA and RRP procedures, especially for land acquisition, the JST prepared a draft questionnaire to be sent to DFCCIL to clarify the status of the ESIA and RRP. The questionnaire form was finalized and sent to the counterpart (C/P) incorporating comments from JICA.

(4) Preparation of the Inception Report (IC/R)

The draft IC/R consisting of the survey approach, survey contents, survey items, survey methods, organizational structure, work plan and task allocation was prepared by the JST. Additionally, a list of the required documents for the Survey was prepared by the JST after reviewing and organizing the relevant data. As for the data collection on the finalized/latest alignment, the JST worked and communicated with the E/S Team and incorporated any changes in the IC/R accordingly. The draft IC/R was finalized and printed by the JST after consulting with JICA on the survey background, approach, required survey level, scope of work, schedule and other remarks.

(5) Preparation of a Draft TOR of the ESIA Study

The draft TOR of the ESIA study, namely the ESIA report, RRP report and PCMs on ESIA & RRP was prepared before the first field survey. The draft TOR was revised by incorporating JICA’s comments and requests. Then, the draft TOR was finalized after the JST’s site visits and discussions with MOR/DFCCIL at the early stage of the first field survey and sent to JICA for approval.

3.2.2 Field Work in India (Mid-August 2010 – February 2012)

(1) Presentation of IC/R

During the early stage of the field work, the draft IC/R was explained by the JST to the JICA India Office and this was updated in accordance with their comments. After finalization of the IC/R, the same contents were explained to the MOR, DFCCIL and JICA India Office on 20th of August, 2010.

(2) Confirmation of the Existing Data and Current Status

Following the presentation and discussions on IC/R, the availability of the existing environmental and social study, the current land acquisition status and any other items in the questionnaire sent to DFCCIL were clarified by the JST. The JST members in charge of the ESIA/RRP and public consultation discussed the questionnaire with the DFCCIL and DFCCIL's consultant(s) and confirmed the existing data/items.

(3) Review of the Legal Documents on Environmental & Social Considerations of India and Existing Relevant Information

The JST collected and reviewed legal documents on ESIA and RRP, information on the organizations in charge of ESIA and RRP, and other relevant information on land use, natural environment, environmental pollution and socio-economic conditions (e.g. maps, environmental outlook reports, and socio-economic statistics). The JST members collected information from relevant organizations such as Ministry of Environment and Forests, District Forest Office and Central Pollution Control Board (CPCB).

(4) Technical Assistance in Preparation of the ESIA Report

Considering the requirements of the above-mentioned legal documents on ESIA of India, the Ex-JBIC Guidelines, and the World Bank Operational Policy 4.01, the ESIA preparation plan was refined to fulfill the Indian environmental regulations and the international standards. The tentative plan was presented to the C/P, namely MOR and DFCCIL, and the JST provided technical assistance to the C/P for the ESIA implementation. In addition, the ESIA preparation plan was prepared by considering requirements of the new JICA Environmental and Social Considerations Guideline (2010) which was applied to the projects requested after 1 July 2010. More specifically, one social impact item, "Labor Environment (Occupational Health and Safety)" was included in the impact assessment in the ESIA report.

As for alternative examinations, it was conducted by reviewing past alternatives as part of ESIA. In this survey, the past alternative alignments and technical alternatives in the Phase 2 section was summarized in the ESIA report, and the scale of environmental and social impacts of these alternatives such as the impact on protected areas or populated areas was confirmed by reviewing these past alternatives and to make sure the negative impacts were minimized.

It was important in examination of the alternative routes of the DFC that environmental and social impacts be minimized, considering the whole route which was also economically feasible. Since flexibility is rather limited in the route planning in railway development, any change in the route would cause various impacts to a wide range of area.

Tentative scope of the ESIA Study is shown in Table 3.1, which was planned to be conducted by a sub-contractor under the JST.

Table 3.1 Summary of Scope of the ESIA Study

Item	Tentative Scope of the ESIA Study
Natural Environment	<p>(1) Protected Forest:</p> <ul style="list-style-type: none"> - Identification of the boundary of the recorded forest(s); - Collection of information from/ and interview with Forest Department and academicians; - Estimation of the number of trees to be cut (e.g. height and diameter in each species); and - Field reconnaissance by a local consultant (e.g. Fauna: linear trekking survey; Vegetation distribution: quadrature survey). <p>(2) Wildlife Conservation Area:</p> <ul style="list-style-type: none"> - Identification of the boundary of the wildlife conservation area(s); - Collection of information from and interview with Forest Department and academicians; and - Field reconnaissance by a local consultant (e.g. Fauna: linear trekking survey; Vegetation distribution: quadrature survey)
Noise & Vibration	<p>(1) Inventory Survey on the Sensitive Receptors: Sensitive receptors such as schools, hospitals, religious places within 60-100 m from the center line of the new DFC railway will be identified using satellite images, field reconnaissance and interviews with local residents</p> <p>(2) Landuse Survey: The land use within 60-100 m from the center line of the new DFC railway will be identified using satellite images and field reconnaissance.</p> <p>(3) Noise & Vibration Measurement:</p> <ul style="list-style-type: none"> - Existing railway noise and vibration measurement at sensitive receptors along the major railway stations (approx. 10 sites); - Background noise and vibration measurement along the major railway stations; and - Railway noise and vibration prediction at the same sites.
Water Quality	<p>(1) Identification of the major rivers likely affected by the bridge construction for the DFC Project;</p> <p>(2) Measurement of water quality (e.g. temperature, pH, electric conductivities, water flow, DO, SS, BOD, COD, etc.) in the rivers identified above in 2 seasons; and</p> <p>(3) Collection of existing data on water quality (e.g. temperature, pH, electric conductivities, water flow, DO, SS, BOD, COD, coliforms, etc.) from the Ministry of Environment and Forests, Central Pollution Control Board (CPCB) and the other government institutes.</p>
Social Environment	<p>(1) Socio-economic data on demography, social status (caste and tribe), local economy, local culture & customs and land tenure will be collected through the baseline survey of RRP.</p>
Literature and Interview Survey	<p>(1) In addition to the above-mentioned environmental information, the existing data on air quality, water quality, soil, status on solid waste, bottom sediment, ground subsidence and offensive odor will be collected.</p> <p>(2) Interviews with the experts on the relevant field will be conducted if necessary.</p>
Preparation of Environmental Management Plan (EMP) and Environmental Monitoring plan (EMoP)	<p>(1) Based on analysis of the collected data, Mitigation Measures, EMP and EMoP will be prepared.</p> <p>(2) Through PCMs on the ESIA, Mitigation Measures, EMP and EMoP will be finalized incorporating feedback from the local residents who participated in the PCMs.</p>

Source: JICA Survey Team

(5) Assistance for PCM regarding ESIA

The JST assisted the C/P in holding a series of PCMs regarding the ESIA in the environmental scoping for the ESIA study and in the preparation of draft ESIA report. In the environmental scoping for the ESIA study, the PCM should be an opportunity for the participants to enhance their understanding on the project as well as explanation of the

outline of the ESIA study. In the preparation of draft ESIA report, while results of the ESIA study were the main contents of the PCM, further detailed and careful explanation of the project is required based on the PCM in the environmental scoping and PCMs regarding the RRP, which were separately conducted during the Preparatory Survey.

Information on the PCMs was widely publicized in the affected area through the various media to encourage PAPs to participate in the PCMs. Principally, any person who is interested in the project is entitled to participate in the PCMs. Affected villages within the boundary of the land acquisition and also those adjacent villages were identified and venues were selected within the accessible distance for those prospective participants. Referring to a series of PCMs for ESIA held in the Phase 1 section, the PCM for the Phase 2 section was planned at district-wise in 12 districts alongside the proposed DFC alignment. In planning the detailed plan for organizing the PCMs, effective and efficient implementation of the PCMs such as several venues in one district and joint implementation by two districts were considered in accordance with the actual distribution and number of residents, and accessibility to the potential participants.

Information on the PCM such as objective, dates and venues, was informed in advance to the PAPs to enhance their participation and to avoid misunderstanding on the project. Following the same manner of the PCMs for the Phase 1 section, prior announcement of the meeting together with associated invitation letters by MOR/DFCCIL was conducted.

In addition to the above basic approach, the PCMs were conducted with consideration for gender balance. The following arrangement was conducted in the PCM to encourage participation of women and hear their opinions as a socially vulnerable group.

Table 3.2 PCM Arrangement for ESIA Considering Gender Balance

	Actual Measure
Invitation to participants	For the past studies related to DFC, announcements of PCMs have been conducted to affected villagers through Gram Panchayat as community leader. To facilitate more participation of the female participants in the PCMs, announcement for the attendance to the PCMs through Gram Panchayat was encouraged.
Opinion slip	To encourage female participants to express their opinions under the situation where women can not speak their opinion out in the public place, opinion slip was used as a method to collect their opinions. Opinion slips were distributed to the participants prior to the meeting and were collected at the end of meeting.
Allocation of female staff	Female local staff who speak local language such as Gujarati, Marathi, and Hindi were allocated at the meeting and facilitate participants' understanding through explanation of material and writings on the opinion slips.

Source: JICA Survey Team

(6) Confirmation of Latest Situation on Land Acquisition and Resettlement

In preparation of the RRP, progress on the implementation of land acquisition and resettlement in the Phase 1 and Phase 2 sections was reviewed. While Notification 20E has been issued in almost all areas for land acquisition in the Phase 1 section, the resettlement process has not yet been initiated. Thus, current progress and plans on the land acquisition was confirmed with DFCCIL headquarters and CPM offices.

Regarding the Phase 2 section, issuance of Notification 20A has been completed except parts of some areas such as Surat in Gujarat. Reasons why Notification 20A has not been issued in some areas was examined. Total number of eligible affected owners was known by obtaining the issued Notification 20A. In addition, the number of project-affected persons due to land acquisition and resettlement, such as land/house tenant and illegal occupants, were determined through the Baseline Survey and Census.

(7) Assistance in the Preparation of RRP

The JST assisted MOR/DFCCIL in preparing a draft RRP report based on the following steps:

- 1) Confirmation of the legal framework of the resettlement
- 2) Confirmation of the project purpose and reason for resettlement
- 3) Study on avoidance and minimization of the resettlement
- 4) Implementation of Baseline Survey and Census
- 5) Examination on definition of PAPs subject to the resettlement and entitlement for compensation and assistance
- 6) Examination on the valuation of the lost assets and measures for compensation
- 7) Examination on the detailed contents of the compensation and support to PAPs
- 8) Examination on grievance mechanisms
- 9) Examination on the organizational setting for RRP implementation
- 10) Preparation of the RRP implementation schedule.
- 11) Cost estimation and financial plan
- 12) Examinations of methods for monitoring and post-evaluation
- 13) Assistance for RRP preparation at international level
- 14) Evaluation and recommendation of the compensation and support for livelihood recovery by reviewing the land acquisition and resettlement in the Phase 1 section.

(8) Assistance for Public Consultation Meetings regarding RRP

The PCMs for RRP were held targeting the PAPs on land acquisition and resettlement. The objective of the PCM is to grasp the opinions and requests of PAPs on the compensation scheme proposed by DFCCIL to meet adequate contents for the PAPs in terms of compensation and support for livelihood recovery in the RRP as much as possible. Assistance was given for the holding of PCMs for RRP under the responsibility of MOR/DFCCIL during the Preparatory Survey. The PCMs were implemented to maximize participation rate of the PAPs and to encourage participants to express frank opinions and requests. The JST provided logistical support in holding the PCMs for RRP with MOR/DFCCIL as well as technical support.

The PCMs for RRP were held at approximately 35 locations where the venue of the PCM was located within accessible distance to all participants ranging from 7-8 km from the residences of PAPs. The detailed plan for the PCM for RRP was prepared based on results of the Baseline Survey and Census, with reference to the detailed location of the PAPs and also the opinion of DFCCIL.

Various measures for the announcement of the PCM were recommended to MOR/DFCCIL using not only English as common language in India, but also vernacular languages in each area.

On the day of the PCMs, visual materials and simple brochures were distributed to participants to enable the participants to understand the matter appropriately. In addition, support measures were applied to receive additional opinions which can not be presented

in the meeting due to limited time. Opinion slips with writing assistants were distributed, especially for illiterate participants.

Considering the completion of adequate PCMs within a limited period, the meetings were conducted simultaneously with multiple teams, using the local resources. To achieve a sufficient level of meeting, the procedure was detailed and instructions and trainings were provided to all the team members prior to the meeting. In addition, during the meeting, the local experts of the JST monitored and reported to the social consideration expert on the preparatory works and implementation on the PCM to facilitate the meeting.

The JST assisted the DFCCIL in compiling and analyzing the meeting results and incorporating participant's opinions to the RRP. The results of the PCMs were compiled as a record of the PCMs for the RRP and incorporated into the Final Report of the Preparatory Survey.

PCMs for RRP were held considering the gender balance as described in the previous section for the PCMs for ESIA.

(9) Recommendation on Organizational Strengthening for Environmental and Social Considerations in Implementation Agency

The JST suggested measures of organizational strengthening for environmental and social considerations in DFCCIL at both central and local levels, by reviewing practices in the Phase 1 section. Although the SEMU under DFCCIL was established in 2009, sufficient personnel have not been allocated in terms of quantity and quality to cover all environmental and social aspects related to the project. The capacity of the personnel is highly related to the process on the environmental and social considerations. The SEMU and CPM offices require covering various environmental and social aspects related works such as confirmation and monitoring on the countermeasures recommended in the EIA, implementation of Baseline Survey and Census on RRP and its evaluation, appropriate implementation of land acquisition and resettlement to meet the RRP. The JST made the recommendation on the appropriate enforcement of organizational capacity of DFCCIL.

(10) Preparation of Draft Final Report (DF/R)

Draft Final Report (DF/R) was prepared by compiling all of the results of the Preparatory Survey.

(11) Discussion on DF/R

The DF/R was presented to MOR/DFCCIL to obtain comments, if any, and get mutual consent on the results of the Preparatory Survey. Results of the discussion and comments were incorporated into the Final Report.

3.2.3 Second Work in JAPAN (March 2012)

(1) Preparation of Final Report

Final Report (F/R) was prepared by reflecting the comments on DF/R from MOR/DFCCIL and JICA.

3.3 CONSTRAINTS AND APPLIED COUNTERMEASURES TO THE SURVEY

3.3.1 Constraints and Applied Countermeasures to Baseline Survey and Census

(1) Survey Coverage

Around 2,588 plots (29%) could not be surveyed either because all titleholders registered to the plots were absent during the survey period or they have opted not to participate in the survey. The share of incomplete plots is particularly high in Faridabad where the survey was completed for less than half of the affected plots.

(2) Potential Biases

With a few exceptions (area and number of affected plots), the survey results are entirely based on information provided by Project Affected Families (PAFs) and as such, may not be accurate. A bias can occur in both directions. For example, a PAF may report an income figure higher than their actual income with the hope that compensation may be proportional to the reported income. On the other hand, they might report less than the actual figure thinking that a poorer family may be entitled to more generous compensation.

3.3.2 Constraints and Applied Countermeasures to Public Consultation Meeting (PCM)

(1) PCM for ESIA

1) Gap in PCM for ESIA

In every PCMs for both environmental scoping and draft ESIA, main questions and comments from the participants were related to land acquisition and resettlement, especially for the compensation rate, even if it was explained in the beginning and during the PCM that the PCM was targeted for the ESIA only and another PCM for RRP with more detailed explanation would separately be held later for PAPs who will be affected by the land acquisition for the project.

2) Increase number of Venue in Thane District

PCM for ESIA was held at the district-level and one venue was selected in each district for all affected districts in the beginning. However, since the length of the proposed DFC alignment in Thane District is over 100 km, the PCM was separated into two venues in the environmental scoping to make more accessible to participants.

3) Limiting Opportunities for Weaker Groups or PAPs

Sometimes the meetings are dominated by individuals/ interest groups, thereby limiting opportunities for other weaker groups or PAPs to participate actively. In addition, it is not realistic to obtain opinions from all participants who wanted to tell her/his opinions and questions due to various reasons such as time limitation. Therefore, opinion slips were distributed to the participants to fill out her/his opinions. For the participants who do not know how to write, writing support was provided by the PCM assistants to such persons.

4) Poor Participation of Women

In most of the PCMs, there was poor participation of women. This is because men participated in the meeting as the family-head in most cases. Under this situation, it is

difficult to facilitate the participation of women in addition to men as family-head to avoid becoming a large-scale mass meeting.

(2) PCM for RRP

1) Invitation Process

At almost all the PCMs, PAPs showed their dissatisfaction about the method of the invitation process, demanding to receive a letter directly. This method might have been ideal, since there is no complete record of names and addresses of all PAPs at the moment to pursue such an approach.

2) Participation of the Full RRP PCMs

The participation rate accounted for only 20-30% of all households in Noida, Vadodara and Surat PCM jurisdictions. It was analyzed that the following facts contributed to this relatively low participation rate:

- In villages in Vadodara and part of Surat jurisdictions, many of the PAPs have already been paid or awarded compensation (e.g. 185 out of 216 PAPs in a part of Bharuch District). Therefore, the majority of them might not have been interested in attending the meetings.
- PCMs took place during weekdays. Many PAPs did not want to lose their daily earnings or did not want to pay transportation fees by themselves for attending PCMs.
- Previously, two ESIA-related PCMs had been held for several months, targeting almost the same populations, which gave opportunities for PAPs to raise comments and concerns regarding not only environmental impacts but also resettlement and rehabilitation-related issues.
- The low participation rate itself should not be of too much concern; rather, the reasons why many PAPs chose not to attend should be addressed by DFCCIL.

3) Location of PCMs

At some PCMs, PAPs were not able to reach the venue because they could not find it. The venue of the PCMs should be very familiar for the participants. Also it should be close to the railway station or major bus stands for easy access as much as possible unless the affected villages are far away from the railway stations or major bus stands. Alternatively, common vehicles could have been provided to pick up and drop off the PAPs from their respective villages if the numbers of affected villagers or participants are small enough.

4) Presentation/Handouts

Contents of the presentation should have been localized, like including the state laws and policies, specific information including planned width of Right of Way (ROW), Road Over Bridge (ROB) and Road Under Bridge (RUB), etc. In addition, some case examples could have been included so that PAPs could relate themselves and understand their entitlement well.

5) CPM Officers

The outcome of the PCMs often depended on the capacity and attitude of the attending CPM officers. If the CPM officer is knowledgeable about entitlement, laws and regulations as well as situations in the field, PAPs were often satisfied with his

explanations, even though they do not agree with the contents. CPM officers should always carry related documents with them to answer the questions spontaneously raised by PAPs. Also, CPM offices should give more attention to the prepared materials, including contents of presentations and handouts, and make contributions to the contents at the preparatory stage of the PCMs.

6) Attendance of Competent Authority (CA)

CA's presence is very important for a meaningful PCM as some of the critical questions can only be addressed by the CA office, including land issues and compensation payments. Therefore, the CPM office should make efforts to secure the presence of CA officers.

7) Special Attention to Women and Scheduled Caste (SC) / Scheduled Tribe (ST)

Regional cultural contexts may have affected women's participation rates. It is said that women's participation in social activities are more accepted in Gujarat State than the Northern States, and actually there were higher participation rates in CPM Surat jurisdictions.

It was effective to collect diversified comments to let minority PAPs (non-titleholders, women, vulnerable groups, etc.) who are sitting in the back to raise their concerns/queries, and not only allow people who are sitting in the front rows to voice their individual interests.

8) Preparatory Workshop

Preparatory workshops, involving CPM officers, presenters, coordinators, and JST contributed to the success of the PCM this time. They gave presenters and coordinators a clearer image of what they are required to do. They also brought more ownership, awareness and interest among CPM officers. In addition, the workshop contributed to building team spirit among related parties.

3.3.3 Public Resentment

Public resentment was found during the survey, especially in the PCMs for both ESIA and RRP and in the field work of the Baseline Survey and Census in Faridabad and Thane Districts. During the environmental scoping, some PCMs have not been completed due to public resentment by the participants. For those PCMs, measures to address or mitigate public resentment were not well prepared and implemented from the project side. Therefore, PCMs were held again after necessary preparations to respond to such participants and coordination with some local influential persons such as village leaders were conducted. In the subsequent PCMs for draft ESIA and draft RRP, in addition to the preparatory and coordination work prior to the PCM, a separate meeting was sometimes held for cases where public resentment was expected or previously occurred during the PCM, to avoid aggravating the situation.

3.3.4 Others

(1) Survey Permission in the Protected Areas

It took time to obtain the survey permission from respective Forest offices in the protected areas such as the SGNP. This was one of the reasons for the delay of the field survey for the natural environment. To facilitate getting the permission as soon as

possible, direct visit and explanation of the project and survey to the respective Forest offices were conducted by the respective CPM office, subcontractor, and the JST.

(2) Identification of Boundary of the Protected Area

Even though the alignment information was available in FLS, it was not clear whether the proposed alignment affects the protected area or not, especially in the SGNP. Therefore, a joint survey was needed to be conducted among the respective Forest offices, CPM offices, subcontractor, and JST to confirm the boundary of the protected area and the proposed alignment.

PART II
ASSISTANCE IN THE PREPARATION OF
ENVIRONMENTAL AND SOCIAL
CONSIDERATIONS STUDY REPORT

PART II ASSISTANCE IN THE PREPARATION OF ENVIRONMENTAL AND SOCIAL CONSIDERATIONS STUDY REPORT

CHAPTER 1 REVIEW OF PAST STUDIES

1.1 ENVIRONMENTAL AND SOCIAL IMPACT MITIGATION MEASURES STUDY (ESIMMS) FOR VADODARA - VASAI ROAD SECTION

In April 2005, Japan-India Summit meeting was held in Delhi and it was agreed by prime ministers of both countries to share the view that Japan's STEP scheme could be one of the effective means for carrying out large-scale priority projects in infrastructure sector in India. The two sides confirmed their intention to examine the feasibility of the Dedicated Multimodal High-axle Load Freight Corridors with Computerised Train Control System on Mumbai-Delhi and Delhi-Howrah routes ("the DFC Project") utilizing STEP scheme and with the inputs of Japanese technology and expertise. In July 2005, the Government of India (GOI) officially requested the Government of Japan (GOJ) for the execution of Japan's technical cooperation to assess the feasibility of the Project, and the GOJ decided to conduct the feasibility study (F/S) on the project in November 2005. In February 2006, JICA dispatched the preparatory study team, and the scope of works (S/W) of the study and the minutes of meeting (M/M) were signed and exchanged between MOR and JICA. The study was to conduct: 1) Baseline survey of the subject railway line and grasp the issues (Task 0); 2) Justification of the construction of the new freight corridor by comparison of alternatives (Task 1); 3) Feasibility Study on the Project (Task 2); and 4) to share Japanese experience in railway development and management (Task 3).

In June 2006, JICA dispatched the Study Team to India for the commencement of the site survey. The study areas are listed below, which were confirmed in the S/W between the GOJ and GOI.

- 1) DFC Western Corridor: JNPT - Dadri, Tuglakabad ICD including branch lines
- 2) DFC Eastern Corridor: Sonnagar - Dhandarikalan (Ludhiana), Khurja - Dadri including branch lines

In the first year of the Study, the Environmental and Social Considerations Study (ESCS) was conducted as an initial environmental examination level study for the whole corridor of the DFC Project. The objective is to examine primarily the environmental and social impacts caused by the DFC Project as well as to conduct alternative analysis and environmental scoping for Environment and Social Impact Mitigation Measures Study (ESIMMS). In the ESCS, video recording of railway was undertaken from the train along the whole corridor of the DFC Project to record the present environmental/social and railway facility/structural conditions. In addition, GIS mapping was conducted by using satellite images along the 1-km strip of the present railway. Then, the ESIMMS was conducted for the priority section of the DFC Project in the second year of the Study to examine potential impacts, evaluation, mitigation measures and environmental management plan (EMP) and environmental monitoring plan (EMoP) as well as preparation of RRP framework.

1.2 PREPARATORY SURVEYS FOR DFC PROJECT

After the above Survey, GOJ implemented studies regarding environmental and social considerations for the DFC Project as follows:

(1) Supplemental Environmental and Social Impact Mitigation Measures Study (S-ESIMMS) of the DFC Project

Supplemental surveys and studies to the former ESIMMS were required as part of the environmental impact assessment (EIA) level study such as consideration of seasonal changes of flora and fauna in the area, more detailed noise and vibration study taking into consideration the distribution of sensitive receptors, and wider socio-economic survey for social impact assessment. In addition, after JICA F/S, FLS works have progressed and it has been identified that there are deviations between the alignments proposed in GLD and described in FLS. The deviations of the alignments between Vadodara and Rewari have been reviewed during the study on SAPROF of the DFC Project, which was conducted in July 2008, and the alignments were finalized together with locations of other important railway facilities such as junction stations. Therefore, the Supplemental Environmental and Social Impact Mitigation Measures Study (S-ESIMMS) has been conducted based on the finalized alignments of the DFC Project between Vadodara and Rewari.

(2) The JICA Preparatory Survey for DFC Project (Phase 2 Section)

Prime Ministers of GOJ and GOI have expressed their commitment for early assistance provision in the entire Western Corridor, and to achieve earlier realization of the rest of the Western Corridor (with a total length of 565 km consisting of Rewari-Dadri, 145 km and JNPT-Vadodara, 420 km), the JICA Preparatory Survey for DFC Project (Phase 2) was conducted in February 2010. In the course of the Preparatory Survey, the preparation of the EIA and RRP, and organization of PCMs on the ESIA and RRP were identified as required tasks after reviewing the F/S and project preparation.

1.3 CLARIFICATION OF NECESSARY ENVIRONMENTAL AND SOCIAL CONSIDERATIONS STUDY

In the above Phase 2 Study, it was confirmed that the past environmental and social consideration studies for the DFC Project have not satisfied the requirements of the Ex-JBIC Guideline for Confirmation of Environmental and Social Considerations, April 2002 (Ex-JBIC Guidelines). Therefore, the Preparatory Survey aims at assisting the GOI in preparing the ESIA report and RRP report including holding the PCMs on ESIA and RRP for the Phase 2 section.

CHAPTER 2 ASSISTANCE FOR ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) STUDY

The JST assisted in conducting the ESIA study for the Phase 2 section of the DFC Western Corridor following Ex-JBIC Guidelines'. This chapter summarizes the results of the ESIA study.

2.1 OUTLINE OF ESIA STUDY

2.1.1 Scope of ESIA

The ESIA study, including preparation of an EMP and EMoP, was conducted in order to mitigate potential negative environmental and social impacts in the Phase 2 section of the DFC Western Corridor. The specific objectives of the ESIA study are to:

- i) Identify and assess potential environmental and social impacts and recommend specific mitigation, management, and monitoring measures to avoid, offset or minimize the impacts;
- ii) Formulate an implementable EMP and EMoP integrating the technically and economically feasible measures to avoid the identified impacts and an appropriate monitoring and supervision mechanism to ensure its implementation; and
- iii) Recommend suitable institutional mechanisms to monitor and supervise effective implementation of EMP and EMoP,

The area covered by the ESIA study is spread over 14 districts of five states where relevant railway facilities will be built for DFC development. The ESIA study area is shown in Table 2.1.

Table 2.1 Affected Areas of Phase 2 Section of the DFC Western Corridor

Section	State	Districts
JNPT-Vadodara	Maharashtra	Thane, Raigad
	Gujarat	Vadodara, Bharuch, Surat, Navasari, Valsad
Rewari-Dadri (including TKD line)	Rajasthan	Alwar
	Haryana	Faridabad, Gurgaon, Rewari, Palwal, Mewat
	Uttar Pradesh	Gautam Buddh Nagar
Total	5 states	14 districts

Source: JICA Survey Team

Nearly 70% of the alignment length in JNPT-Vadodara section has been kept parallel to the existing lines. However, it is on an entirely new alignment route from Rewari to Dadri. For providing connection to Tuglakabad ICD, a single TKD line is partly on detour route and partly parallel to the existing Delhi-Mathura line.

2.1.2 Components of ESIA

The ESIA study consists of pollution control study, natural environmental study, social impact study, public consultation and information dissemination, impact identification and assessment, preparation of mitigation measures, and preparation of EMP and EMoP. Various environmental and social parameters were studied along the proposed corridor route during 2010-2011 with the relevant primary data generated on the river water quality, natural environment, land use, sensitive receptors, noise and vibration, hydrogeological and social baseline surveys along with the secondary information collected from various

statutory agencies of the State Governments to identify, assess and predict potential impacts due to various activities of the project. PCMs were also conducted in various districts of the five states and the affected population's responses were recorded.

The ESIA report covers the detailed analysis of alternative project alignments, analysis of Indian environmental legislations applicable to the Project along the proposed corridor and the necessary statutory clearances likely to be obtained by the executing agencies. The report also highlights the clearance procedures involved for the execution of the Project and detailed overview of the existing environmental conditions along the project corridor. Mitigation measures are identified for all environmental impacts due to the proposed project activities and its components. EMP and EMoP focused on the implementation of mitigation measures at various stages of the Project to curtail adverse impacts including a detailed monitoring plan for safeguarding the environment with a time frame for the monitoring activities.

2.2 OUTLINE OF THE PROJECT

2.2.1 Project Scope for ESIA

The evaluated project scope subject to the ESIA is shown in Table 2.2.

Table 2.2 Summary of Project Scope for ESIA

Section		JNPT-Vadodara	Rewari-Dadri
Items			
Length of Alignment		420 km (Detour: 121 km and Parallel: 299 km)	145 km (Detour: 137 km and Parallel: 8 km)
Tunnel		1 (540 m)	-
Junction Station		3 (JNPT, Kharbao, Gothangam)	3 (Pirthala, Dadri and TKD)
Cross Station *1		9 (Nilje, Palghar, Gholvad*, Navsari, Joravasan*, Sanjali, and Varediya)	2 (Dharuhera and Mewat)
Railway Flyovers		7	2
Road over Bridge (ROB)		58	19
Road under Bridge (RUB)		145	95
Total Bridges over rivers	All Bridge	701	72
	Important Bridge	13	2
Substation		60 km distance*3	60 km distance*3

Note: 1. Additional Cross Station is under planning.

2. The depot plans are not included in the Phase 2 section.

3. The distance is referred to Phase 1 data.

Source: JICA Survey Team

2.2.2 Examination of Alternatives

(1) Examination of Detail of Alternatives

1) Examination of Detour Alignment

In the Phase 2 section, the entire mainline section of Rewari-Dadri is a complete detour. For providing connection to Tuglakabad ICD, a single TKD line is partly on detour route and partly parallel to the existing Delhi-Mathura line. In JNPT-Vadodara section, detour has been largely considered to avoid heavily built-up areas involving major rehabilitation problems because it will affect a large number of people and difficulties in land acquisition and high acquisition costs as well as difficulties in execution of the project in heavily built-up area. Detour routes have been carefully planned so as to minimally affect fertile agricultural land though complete avoidance is not possible.

2) Examination of Parallel Alignment

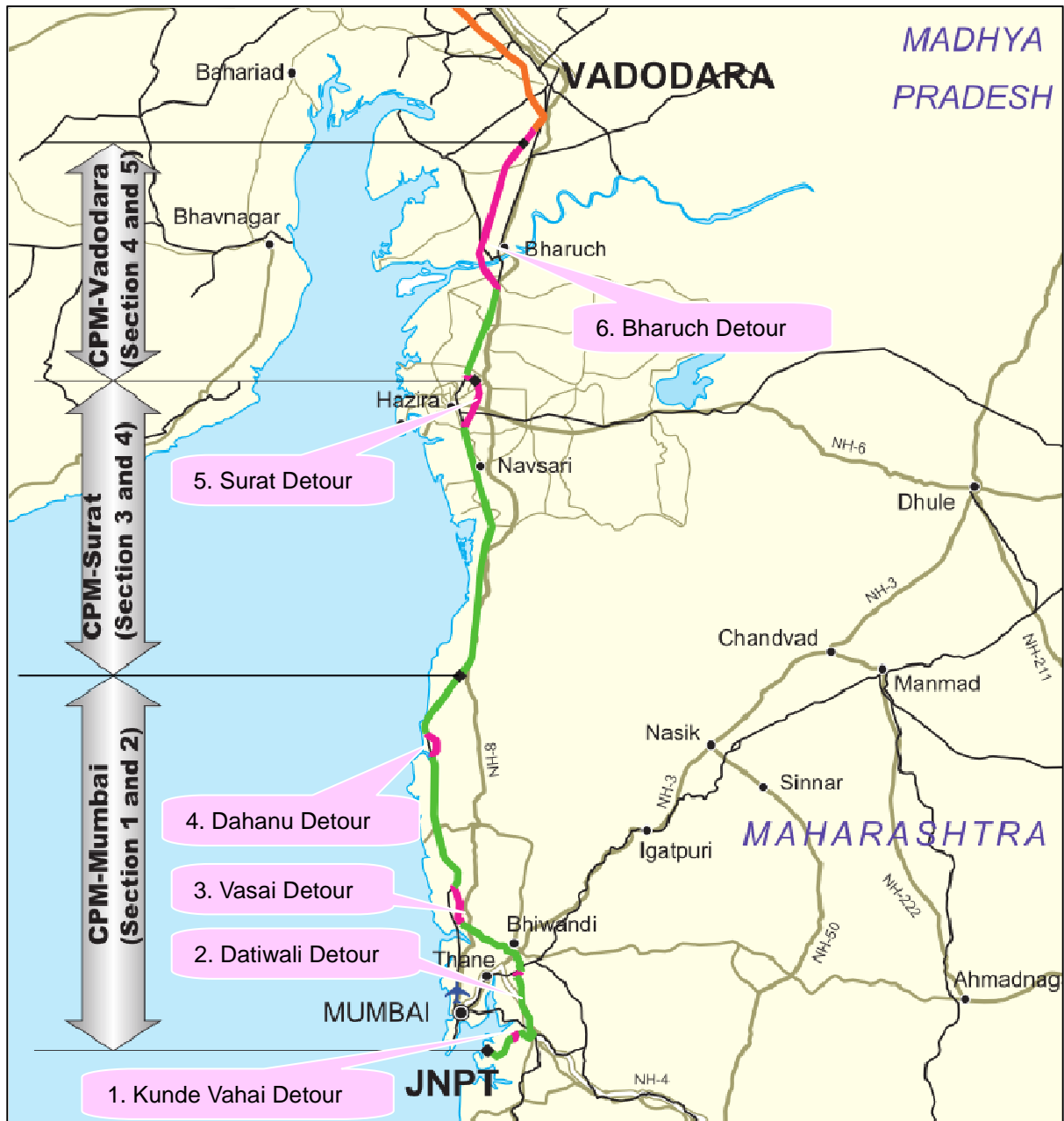
Less urbanized areas have more land width available for ROW near the existing railway track. If resettlement and rehabilitation of illegal settlers who have settled within or near railway land is minor, the parallel alignment could be cost effective as compared to adopting an option of detour route and the project cost could considerably reduced even after including cost of compensation for resettlement. Hence for the less developed. Hence for the less developed areas near the existing Indian Railway (IR) tracks, parallel alignment is preferable.

Table 2.3 Alternatives for Detours in JNPT-Vadodara Section

S. No	Detour	Contents of Alternatives and Considerations	Selected Alternative and Reason of the selection
1	Kunde Vahal Detour	<p>Alternative 1: A length of 3.45 km passing from outside of the village to smoothen out sharp radius of curve, and avoid mountainous metal quarry site. Provision of tunnel alignment also considered but this alignment route traverses through a large area of agricultural land.</p> <p>Alternative 2: Open cut to cross over the already degraded quarry mountain and passing through Kunde Vahal Village i.e. 50 to 65 m away from the existing IR track in a stretch of 400 to 500 m. However, the alignment will affect many existing habitation in the village entailing major issue of resettlement and rehabilitation. Furthermore, the local community in the village will be completely affected due to a division of village into two parts by the DFC embankment.</p> <p>Alternative 3: An alignment route with a total length of 2.30 km to pass along the edge of mountainous metal quarry site and between outer boundary of Kunde Vahal and Ovale Villages. This alignment gives many advantages – reduced length of detour alignment, minimal effect on loss of agricultural land, minimal effect on resettlement issue, minimal interference of quarrying operations on DFC activities, and other social and environmental benefits. However, this route will affect Electrified High Tension Towers (HTT) line in the area.</p>	<p>Alternative 3</p> <ul style="list-style-type: none"> - Sharp curve of the existing IR track - Main habitation of Kunde Vahal Village getting bifurcated by DFC track - Avoidance of mountainous metal quarry site
2	Datiwali (Diva) Detour	<p>This detour route is selected vis-à-vis a parallel route to avoid built up area in and around Datiwali Station, a marshy area near Ulhas creek, and many sharp curves of existing IR track. No existing village habitation will be affected by this detour route. In the parallel alignment immediately after detour and south of the Ulhas River, it is proposed to provide reinforced vertical wall near the built up area where embankment will be approximately 10 meter high.</p>	<ul style="list-style-type: none"> - Heavy built-up area in and around Datiwali Station - Marshy area near Ulhas Creek - Many sharp curves of the existing IR track
3	Vasai Detour	<p>This detour will a total length of approximately 18 km will be provided between Juchandra and Vaitarana Stations to avoid a number of built up areas between these stations at Vasai Road, Nalasopara and Virar in particular. In the surrounding area of Vaitarana River, there is marshy land. There are lots of development activities along the existing railway track. Also, there are three road over bridges (ROB) which will have to be rebuilt. It is extremely difficult to rebuild these ROB as the area is fully developed.</p>	<ul style="list-style-type: none"> - Large scale built-up area at 3 stations at Vasai Road, Nalasopara and Virar on existing IR track - Illegal settlers on railway land at these 3 stations - Marshy area near Vaitarana River - Difficult to rebuild 3 ROB as the area is fully developed around them

S. No	Detour	Contents of Alternatives and Considerations	Selected Alternative and Reason of the selection
4	Dahanu Detour	<p>Alternative 1: It was planned to provide detour of length with a 7 km around Dahanu Road Station due to the following two reasons. Firstly, there exists an ROB near Dahanu Road Station which is difficult to re-construct as the area is fully occupied by residential buildings and the traffic on this ROB is so heavy that it is not possible to suspend traffic on ROB during re-construction period. Secondly, as part of the augmentation of the suburban services, a new goods shed has been constructed on the south east side of the Dahanu Station and in the north there will be EMU terminal with circulating area in the east. As a result, it will not be possible to have any access for the DFC tracks through the yard. Moreover, many new construction activities are in progress in the area adjoining the station and also along the existing western railway line before and after Dahanu Station.</p> <p>Alternative 2: It was found that the above alternative had some limitations. The southern part of Dahanu Road Station or the eastern side along the existing railway line is a swampy area and also surrounded by a number of salt pans. As a result, this part is not suitable for providing DFC alignment as it would need extensive soil stabilization measures for proper foundation treatment to run heavily loaded DFC trains. It was therefore decided to extend detour route on the southern end by another 5 km to avoid both the swamp area and the salt pans. Overall efforts were made to select appropriate alignment route for detour so as to have a minimal effect on the existing vegetation and habitation area in Dahanu but in view of the DFC design criteria, some areas having matured trees will be affected. The project will compensate for the loss of trees by adopting pre-afforestation measures which will be done in consultation with the Dahanu Taluka Environmental Protection Authority (DTEPA).</p>	<p>Alternative 2</p> <ul style="list-style-type: none"> - Difficult to rebuild ROB near Dahanu Road Station as the area is fully developed - Dahanu Road Station is already developed as a yard for suburban services and any access for DFC track is not feasible - Number of on-going construction activities in and around existing track leading to and from Dahanu Road Station - Existing IR track in Dahanu area is surrounded by swampy areas and a number of salt pans
5	Surat Detour	<p>Alternative 1: It was considered to provide a parallel route along existing railway track. Considering a large number of illegal settlement along existing railway track between Udhna Junction and Surat Junction, it was, however, found that this option was not feasible. In case this alternative is implemented, it would require a large scale resettlement plan for illegal slum dwellers and would invite a lot of social issues. Also, site conditions were found to be not favorable for construction of important bridge on Tapi River on this route.</p> <p>Alternative 2: It was considered to provide full detour from Sachin to Gothangam. In this alternative, there is no settlement along the alignment route but the entire route would traverse through cultivated agricultural fields. However, expansion of Surat City development on the eastward side and towards the DFC line would pose a serious challenge to this alignment option.</p> <p>Alternative 3: It was considered to provide parallel 4 km route along the existing feeder line before taking a full detour route at Northern part. In this alternative, there is no settlement along the alignment route. Considering the further expansion of Surat City to the eastward side, this alternative would give some advantage as compared to Alternative 2 but addressing the entire issue would be difficult due to long, high embankment of DFC detour on the east side. It is also being considered to provide viaduct structure after the parallel line to the feeder route toward Tapi River Bridge.</p>	<p>Alternative 3</p> <ul style="list-style-type: none"> - Large number of illegal slum dwellers within and around railway land along existing railway track between Udhna Junction and Surat Junction - Unsuitable site conditions for constructing bridge on Tapi River on this route - Expansion of Surat City Development on the eastward side and towards DFC track
6	Bharuch Detour (a part of Sanjali Nadiad Detour)	<p>The project will provide a complete detour route of length approximately 30 km between Sanjali and Varediya in Section 4 and of length approximately 30 km between Varediya and Makanpura in Section 5. The proposed alignment from Gothangam Station (end of Surat Detour) would run parallel to the existing track on east side up to Sanjali. The alignment crosses Mumbai-Delhi mainline of Indian Railways on north of Sanjali Station by means of a flyover and then runs along the detour route on west side of existing track till the end of Phase 2 alignment in JNPT-Vadodara section.</p>	<ul style="list-style-type: none"> - Heavy built-up area of Bharuch and Ankleshwar City - Number of industrial units close to existing IR track in Ankleshwar - Existing bridge at Bharuch is passing through the main city and an additional bridge cannot be built here

Source: JICA Survey Team



Source: JICA Survey Team

Figure 2.1 Location of Alternative Detours in JNPT-Vadodara Section

2.3 EXISTING ENVIRONMENTAL AND SOCIAL CONDITIONS OF THE PROJECT AREA

Summary of the overview of the existing environmental and social conditions of the project area is shown in Table 2.4.

Table 2.4 Overview of the Existing Environmental and Social Conditions

Item	Summary of the existing conditions
1. Climate	<p>Maharashtra section is located in tropical wet and dry (warm and humid) climatic zone with an annual average rainfall of 3,030 mm and 2,300 mm in Raigad and Thane Districts respectively.</p> <p>Gujarat section is located in hot and dry climatic zone with varying annual average rainfall from 2,200 mm in Valsad District to 800 mm in Bharuch District and other districts falling within this range.</p> <p>Rewari-Dadri section is located in semi-arid (composite) climatic zone with annual average rainfall from 542 mm in Faridabad and Palwal Districts to 731 mm in G. B. Nagar District. Other districts also have rainfall in this range.</p>
2. Ambient Air	<p>Relatively higher to critical levels of PM₁₀ are observed in the ambient air of most of the cities and in some cities, values are much higher than the permissible limits prescribed in the Revised National Ambient Air Quality Standards, 2009. The levels of sulphur dioxide are below the prescribed values even for the notified ecologically sensitive areas in most of the cities. However, levels of nitrogen dioxide show trend closer towards or slightly above the prescribed unified standards for industrial, residential, rural and other areas. Some DFC Project areas are identified as critically polluted areas by CPCB based on Comprehensive Environmental Pollution Index (CEPI).</p>
3. Physiography	<p>The dominant physical trait of the Maharashtra State is its plateau characteristics. Thane and Raigad Districts are part of the north Konkan Region that lies towards the west of the Sahyadri Ranges.</p> <p>The state of Gujarat is situated on the west coast and is divided into three parts - the coastal, the plains, and the eastern highlands. Surat, Valsad, Vadodara and Navsari Districts come under the 'Main land Gujarat' regions.</p> <p>The Aravalli in Mewar and Alwar Districts consist of organic and volcanic action and presently it is undergoing weathering and denudation. Palwal District has monotonous physiography and has alluvium deposits. Alwar District is fairly regular quadrilateral in shape and the Aravalli range forms parallel ridges of rocky hills for the most part. Mewar District is largely comprised of plains and the area is divided into two tracts - upland and low land. Gurgaon District has a conspicuously flat topography. G. B. Nagar District belongs to an area of highly fertile alluvial soils and flat topography.</p>
4. Land Use	<p>Land use classification survey for acquired land reveals that in JNPT-Vadodara section, the agricultural area is nearly 30.4% as compared to 72% in Rewari-Dadri section. This is mainly due to the fact that the entire Rewari-Dadri main line as well as the major part of TKD line is a detour route whereas in JNPT-Vadodara section, the detour part is about 29%. The wasteland and low land area together constitute about 30.3% and 19.4% in JNPT-Vadodara and Rewari-Dadri section respectively.</p>
5. Water Resources	<p>The DFC Project will cross over 11 important rivers between JNPT and Vadodara and these rivers are - Ulhas and Vaitarna in Thane District; Damanganga, Par, Auranga in Valsad District; Kaveri (South and North), Ambika, North Poorna, Mindhola in Navsari District; Tapi in Surat District; and Narmada in Bharuch District.</p> <p>In Rewari to Dadri section, the corridor will cross over the Yamuna River at the border between Faridabad and G. B. Nagar District and Hindon River in G. B. Nagar. Both are perennial rivers in the area.</p>
6. Soil	<p>Three main types of soil are found in Thane District – regur soil, red soil and brownish black soil. Laterite and lateritic soils cover most of the part of Panvel and Uran Tehsils of Raigad District. The soils are sandy clay loam to clay in texture.</p> <p>The deep black soils are found in major parts of Bharuch, Surat, Valsad, and the southern part of Vadodara Districts. These soils in general are clay in texture, poor in drainage and neutral to alkaline in reaction. Coastal alluvium soils are also predominant in south Gujarat. Overall, the soil fertility indices for the project villages are average from the point of view of agriculture.</p> <p>Soils from Rewari to Mewar District are sandy to loamy sand alluvial soil (Bhanger) with low water table and undulating topography. The soils in Gurgaon District are mostly rocky surfaces of Aravalli Hills except for some areas. G. B. Nagar District is covered by soils of active flood plains, which are sandy to coarse loamy in texture.</p>

Item	Summary of the existing conditions
7. Geology and Hydrogeology	<p>The detailed study has been done on geology, hydrogeology and drainage characteristics in Aravalli Hills where there will be deep rock cutting and Vasai Detour where the project will build a tunnel.</p> <p>Geologically the Vasai detour area is underlain by alluvium and Deccan basalt inter-bedded with pyroclastic material. The area is represented by flat alluvium terrain undulated with flat-topped hills of basalts forming a chain of plateaus. The area is also structurally disturbed and seismically active. Ground water in the area lies within the range of 5 to 10 m bgl.</p> <p>The rock formations in the Aravalli area are represented by quartzites, mica schist and pegmatite intrusive. Structurally, the area represents an active tectonic zone. In the major part of the project area, the depth of water table lies between 10 m and 20 m. There are two perennial rivers in Rewari-Dadri section - the Yamuna and Hindon Rivers.</p>
8. Habitat	<p>Natural environment conditions vary along the DFC alignment route due to different ecological and agro-climatic variation. Nearly 45% of the alignment route passes through cultivated agricultural areas, barren lands and wastelands. Besides this, the alignment crosses over a number of important major and minor rivers and streams and also traverses through many recorded forest area. The length of alignment in these forested areas is approximately 1.6 km in Gulistanpur reserved forest in G. B. Nagar District and 9.2 km in Thane District. The forested areas in Thane District are mostly dry and degraded land and supports very little habitat patterns. Most of these forested areas are subject to encroachment and increased human activities. The alignment also passes near the edge of the range boundary of the Sanjay Gandhi National Park (SGNP) and through the buffer area but away from the range boundary of the Tungreshwar Wildlife Sanctuary.</p>
9. Flora	<p>Flora along the proposed alignment from JNPT to Vadodara belongs to arid, semi-arid, and coastal climatic system. Forest type comprise mainly of tropical dry deciduous, the Western Ghats, and monsoon forests occur both on the western (coastal) margins of the Ghats and on the eastern side where there is less rainfall. These forests contain several tree species of great commercial significance.</p> <p>In Rewari-Dadri section, the Gulistanpur reserved forest area is a plantation work of the Forest Department. The area has semi-arid climatic plantation of thorny plants such as <i>Prosopis juliflora</i> and <i>Acacia nilotica</i>.</p>
10. Fauna	<p>In Maharashtra, the varied climate and topography have resulted in rich vegetation and a good animal population. The fauna of Gujarat is also quite diverse. The extensive coastal regions of the state give shelter to a number of birds such as plovers, stints, sandpipers, curlews, lesser flamingoes, terns and gulls.</p> <p>In G. B. Nagar District, black-naped hare (<i>Lepus nigricollis</i>) and neelgai (<i>Boselaphus tragocamelus</i>) droppings in the Gulistanpur forest area were observed during investigation for biodiversity.</p>
11. Legally protected Areas	<p>The two notified eco-sensitive areas include the Aravalli Hills in Mewat and Alwar Districts and Dahanu in Thane District. The recorded forest area villages lie in Bhivandi, Vasai, and Palghar Talukas/Tehsils and Dahanu and in Sadar Taluka in G. B. Nagar District. The SGNP is the only protected area living close to the DFC alignment.</p>
12. Seismicity	<p>Almost 54% of the land in India is vulnerable to earthquakes. The corridor in Rewari-Dadri section lies in Zone IV whereas the JNPT-Vadodara section lies in Zone III. Zone IV is called the high damage risk zone. According to the present zoning map, Zone V expects the highest level of seismicity whereas Zone II is associated with the lowest level of seismicity.</p>
13. Socio-economic conditions	<p>1) Demographic profile: In project affected states and districts, Uttar Pradesh (U.P.) is the most populous state followed by Maharashtra, Rajasthan, Gujarat and Haryana. Among main cities, population density is highest in Faridabad.</p> <p>2) Economic profile: Major commercial activities in Raigad District are fish farming, food processing, coir, herbal and tourism. Thane is the third most industrialized district in the Maharashtra State. Valsad is an industrial base for sectors such as chemicals, textiles, and paper and pulp industries. Textiles, diamond business, sugar industry, agro and food processing, paper, engineering and chemicals are some of the key business sectors in Navsari. Industrial development in Surat District is due to a large number of diamond processing, textiles, chemical and petrochemical industries. Bharuch has diversified industrial base in chemicals and petrochemicals, textiles, drugs and pharmaceuticals and ports and ship-building. The industrial clusters in Vadodara include chemicals and fertilizers, pharmaceuticals, biotechnology, cotton textiles, machine tools, glass, engineering, tobacco, fisheries and dairy.</p> <p>In Rewari, agriculture constitutes the main economic resources. At present there are fifteen industrial areas developed in Alwar District. The main occupation in Mewat District is agriculture and allied agro-based activities. Gurgaon District has witnessed a phenomenal growth in all spheres of development particularly in urbanization and in creating a good industrial climate. Palwal is going to have a big cargo demand for road, rail and air transport. The industrial areas of G. B. Nagar will grow due to its inclusion in the proposed Delhi Mumbai Industrial Corridor.</p> <p>3) Health Status There are a lot of primary healthcare centers, community healthcare centers and sub-centers in each project-affected district.</p>

Item	Summary of the existing conditions
	<p>4) Education Status The state-wise literacy rate in the 2011 census is 82.91% in Maharashtra, 79.31% in Gujarat, 67.06% in Rajasthan, 76.64% in Haryana and 69.72% in U. P. Overall. Surat has the highest literacy rate amongst all the districts.</p> <p>5) Heritage There are 28 World Heritage properties in India, out of which 23 are Cultural properties and 5 are Natural properties. All properties are out of the ESIA study area. There are 104 properties of national importance in districts covered by the ESIA. Out of these, 14 are located within project-affected Taluk/Tahsil. For properties whose exact location is identifiable, it is confirmed that they are at least several kilometers away from the railway alignment.</p>

Source: JICA Survey Team

2.4 RESULTS OF SCOPING

2.4.1 Environmental Scoping for the ESIA Study

Environmental scoping for the Phase 2 section of the Western Corridor is described in Table 2.5.

Table 2.5 Environmental Scoping Matrix for the Phase 2 Section

	No.	Likely Impacts	Overall Rating	Project-related Activities								
				Planning / Design Phase		Construction Phase					Operation Phase**	
				Land acquisition	Change of land use plan, control of various activities by regulations for the construction	Land clearing / tree cutting	Alteration to ground by cut land, filling, drilling, tunnel, etc.	Operation of construction equipment and vehicles	Construction of track, station, viaduct/bridges and other related facilities	Traffic restriction in construction area	Operation of trains	Appearance / occupancy of track and related facilities
Pollution	1	Air pollution	B-/B+	-	-	-	-	B-	B-	-	B+	-
	2	Water pollution	B-	-	-	-	B-	-	B-	-	-	-
	3	Soil contamination	B-	-	-	-	-	B-	-	-	-	-
	4	Waste	B-	-	-	-	B-	-	B-	-	-	-
	5	Noise and vibration	A-	-	-	B-	B-	B-	B-	-	A-	-
	6	Ground subsidence	-	-	-	-	-	-	-	-	-	-
	7	Offensive odor	B-	-	-	-	B-	-	B-	-	-	-
	8	Bottom sediment	B-	-	-	-	B-	-	B-	-	-	-
	9	Electromagnetic / radio wave interference	C-	-	-	-	-	-	-	-	-	C-
	10	Obstruction of sunlight	C-	-	-	-	-	-	-	-	-	C-
	11	Disaster	A-	-	-	-	-	-	A-	-	-	-
Natural Environment	12	Topography and geographical features	B-	-	-	-	B-	-	-	-	-	-
	13	Soil erosion	B-	-	-	-	B-	-	-	-	-	-
	14	Groundwater	B-	-	-	-	B-	-	-	-	-	-
	15	Hydrological situation	B-	-	-	-	B-	-	-	-	-	-
	16	Coastal zone	B-	-	-	-	B-	-	-	-	-	-
	17	Flora, fauna and biodiversity	B-/C-	-	-	B-	B-	-	C-	-	-	-
	18	Meteorology	-	-	-	-	-	-	-	-	-	-

	No.	Likely Impacts	Overall Rating	Project-related Activities								
				Planning / Design Phase		Construction Phase					Operation Phase**	
				Land acquisition	Change of land use plan, control of various activities by regulations for the construction	Land clearing / tree cutting	Alteration to ground by cut land, filling, drilling, tunnel, etc.	Operation of construction equipment and vehicles	Construction of track, station, viaduct/bridges and other related facilities	Traffic restriction in construction area	Operation of trains	Appearance / occupancy of track and related facilities
	19	Landscape	B-/C-	-	-	-	B-	-	-	-	-	C-
	20	Global warming	C-/B+	-	-	C-	-	-	-	-	B+	-
Social Environment*	21	Involuntary resettlement	A-	A-	-	-	-	-	-	-	-	-
	22	Local economy such as employment and livelihood, etc.	A-/A+	A-	-	B+	B-/B+	-	B-/B+	B-	A+	-
	23	(Surrounding) Land use and utilization of local resources	B-	B-	B-	-	-	-	-	-	B-	-
	24	Social institutions (including regional severance)	B-	B-	B-	-	B-	-	B-	B-	B-	-
	25	Existing social infrastructures and services	B-/C-	B-	-	-	B-	-	B-	B-	C-	-
	26	Socially vulnerable groups such as the poor, indigenous and ethnic people	C-	C-	-	C-	C-	-	C-	C-	C-	-
	27	Maldistribution of benefit and damage	C-	C-	-	-	-	-	-	-	C-	-
	28	Historical and cultural heritage (including religious matters)	B-/C-	C-	-	-	-	B-	B-	B-	B-	-
	29	Water usage or water rights and rights of common	-	-	-	-	-	-	-	-	-	-
	30	Local conflict of interests	C-	C-	-	-	-	-	-	-	C-	-
	31	Sanitation	B-	-	-	-	-	-	B-	-	-	-
	32	Hazardous (risk) infectious diseases such as HIV/AIDS	B-	-	-	-	B-	-	B-	-	-	-
	33	Accident	B-/B+	-	-	B-	B-	B-	B-	-	B-/B+	-
	34	Occupational Safety	B-	-	-	B-	B-	B-	B-	B-	-	-

Note: * Regarding the impacts on "Gender" and "Children's Right", they might be related to Social Environment criteria.

** 'Operation and maintenance of depot' is excluded in the final scoping matrix and changed from the original scoping matrix, as it is not a part of DFC Phase 2

<Rating>

A-: Serious impact is expected, if any measure is not implemented against the impact.

B-: Some impact is expected, if any measure is not implemented against the impact.

C-: Extent of impact is unknown (Examination is needed. Impact may become clear as study progresses.)

-: No impact is expected. Therefore, EIA is not required.

A+: Remarkable effect is expected due to the project implementation itself and environmental improvement caused by the project.

B+: Some effect is expected due to the project implementation itself and environmental improvement caused by the project.

Overall rating: Highest rate will be the overall rating among the rating of relevant project-related activities for negative and positive ratings, respectively. (e.g. Even if only one "A-" is included in an environmental item, overall rating of the environmental item becomes "A-".)

Reference: Japan Transport Cooperation Association (JTCA) and Japan Railway Technical Service (JARTS) (1996) "Manual for Environmental Considerations in International Cooperation for Transportation Technology (Railway Project) (provisional translation)", Tokyo, Japan.

2.4.2 Checklist of Environmental Scoping

Checklist of environmental scoping with explanation of potential impacts associated with the Phase 2 section is described in Table 2.6.

Table 2.6 Checklist of Environmental Scoping for the Phase 2 Section

No.	Likely Impacts	Rating		Project phase	Explanation on Potential Impacts (Project-related activity is shown in the parenthesis"<>".)
		Overall	By project phase		
Pollution					
1	Air pollution	B-/ B+	B-	C	<Operation of construction equipment and vehicles> <Construction of track, station, viaduct/bridges and other related facilities> Emission of exhaust gas from construction equipment and vehicles and dust pollution due to operation of construction equipment and vehicles would cause air pollution in and around the construction sites during construction.
			B+	O	<Operation of trains> Reduction of hazardous substances emitted from vehicles would be expected due to reduction of traffic congestion and traffic volume by changing freight transportation mode from truck to the proposed railway system.
2	Water pollution	B-	B-	C	<Alteration to ground by cut land, filling, drilling, tunneling, etc.> <Construction of track, station, , viaduct/bridges and other related facilities> Muddy water from construction site and oil spill from construction equipment and vehicles would cause water pollution in the channel/river in and around the construction site.
3	Soil contamination	B-	B-	C	< Leakage of oil and grease from construction equipment> Soil contamination is likely to take place due to leakage of asphalt emulsifier at road pavement. Soil contamination may also take place during filling of oil in vehicles or leakage from vehicles.
4	Waste	B-	B-	C	<Alteration to ground by cut land, filling, drilling, tunneling, etc.> Residue soil due to earth works would cause environmental impact in the disposal site.
			B-	C	<Construction of track, station, viaduct/bridges and other related facilities> Construction waste including residue soil would cause environmental impact in the disposal site.
5	Noise and vibration	A-	B-	C	<Alteration to ground by cut land, filling, drilling, tunneling, etc.> <Operation of construction equipment and vehicles> <Construction of track, station, viaduct/bridges and other related facilities> - Noise and vibration caused by such construction works and construction vehicles/equipment would annoy the residents and school/hospital nearby. - Vibration caused by such construction works would cause damage such as cracks in walls to existing houses and other kinds of building structures.
			A-	O	<Operation of trains> Operation of the trains would cause noise along the railway track during operation time. Religious places near the freight railway and relevant facilities might be affected by the noise and vibration of the freight trains.
6	Ground subsidence	-	-	-	The project does not have any factor which may cause ground subsidence in terms of project location and construction method.
7	Offensive odor	B-	B-	C	<Alteration to ground by cut land, filling, drilling, tunneling, etc.> <Construction of track, station, viaduct/bridges and other related facilities> In some sections that pass along rivers and channels, offensive odor would occur around the construction site due to excavation and dredging of mud in the rivers/channels during the construction.
8	Bottom sediment	B-	B-	C	<Alteration to ground by cut land, filling, drilling, tunneling, etc.> <Construction of track, station, viaduct/bridges and other related facilities> During the construction phase, excavated soil would cause sedimentation, and may be flushed into water course because of rain.

No.	Likely Impacts	Rating		Project phase	Explanation on Potential Impacts (Project-related activity is shown in the parenthesis"<>".)
		Overall	By project phase		
9	Electromagnetic / radio wave interference	C-	C-	O	<Appearance / occupancy of track and related facilities> Embankment/bridge structure of the railway might interfere with the radio wave such as radio and television in cases where the building structure is very close to the railway.
10	Obstruction of sunlight	C-	C-	O	<Appearance / occupancy of track and related facilities> Due to embankment/bridge structure for elevated track, some railway tracks located very close to buildings might cause obstruction of sunlight to buildings, especially residential houses.
11	Disaster	A-	A-	O	<Construction of track, station, viaduct/bridges and other related facilities> Embankment structure of the DFC, which is mainly applied in most of the section, would trap rain water and cause flooding around the project area.
Natural Environment					
12	Topography and geographical features	B-	B-	C	<Alteration to ground by cut land, filling, drilling, tunneling, etc.> In the most of sections, elevated bridge structure of the railway track will mainly be constructed in the center or along the existing road. However, earthworks would affect topographic condition of some sections along the river/channel.
13	Soil erosion	B-	B-	C	<Alteration to ground by cut land, filling, drilling, tunnel, etc.> Construction works along the river/channel in some sections would cause soil erosion.
14	Groundwater	B-	B-	C	<Alteration to ground by cut land, filling, drilling, tunneling, etc.> Associated with the tunnel construction at the Vasai detour, groundwater flow at the area would be affected. Associated with the deep cutting at the Aravalli range at the section of Rewari-Dadri, groundwater flow at the area would be affected.
15	Hydrological situation	B-	B-	C	<Alteration to ground by cut land, filling, drilling, tunnel, etc.> Construction works along the river/channel in some sections would affect hydrological situation in such channel/river.
16	Coastal zone	B-	B-	C	<Alteration to ground by cut land, filling, drilling, tunnel, etc.> DFC alignment passes the swamp area at river mouth in Dahanu, Thane District. Earth works associated with the construction works would affect the coastal environment through contamination by turbid water.
17	Flora, fauna and biodiversity	B-	B-/C-	C	<Land clearing / tree cutting> <Construction of track, station, viaduct/bridges and other related facilities> Existing trees and plants on the ROW and work sites would be removed temporarily or permanently during construction. DFC alignment will pass through the National Park, Wildlife Sanctuary, Eco-sensitive area in Raigad and Thane Districts, Maharashtra State parallel to the existing railway. Animal movements in these areas will likely be affected.
18	Meteorology	-	-	-	The project does not have any factor which may affect and/or be related to meteorology.
19	Landscape	B-/C-	B-	C	<Alteration to ground by cut land, filling, drilling, tunneling, etc.> Construction works such as earthworks would affect the landscape in the project site.
			C-	O	<Appearance / occupancy of track and related facilities> Existence of elevated bridge structure of the railway track would affect the landscape in and around the project site.
20	Global warming	C- / B+	C-	C	< Land clearing / tree cutting> Cutting of existing trees and plants alongside the ROW due to construction of the railway will partly reduce amount of total CO ₂ absorption in the area.
			B+	O	<Operation of trains> With the change of transport mode from fossil fuel used by automobiles to electrified railway system, reduction of emission of greenhouse gases such as CO ₂ will be expected that can be quantified as per unit transport distance per person.

No.	Likely Impacts	Rating		Project phase	Explanation on Potential Impacts (Project-related activity is shown in the parenthesis"<>".)
		Overall	By project phase		
Social Environment*					
21	Involuntary Resettlement	A-	A-	P	<p><Land acquisition> It is expected that a large scale involuntary resettlement (more than 200 persons to be displaced) will be caused by the Project, even though the railway alignment is planned to minimize the scale of the involuntary resettlement by applying the following policy: (1) Existing railway land is used for the DFC as much as possible to avoid land acquisition; (2) In the section where existing railway land is not available in built-up area, detour is planned to avoid/minimize the involuntary resettlement; and (3) Due to some limitations such as curb design of the railway alignment which makes designing sharp curbs impossible, and other topographic condition in the project area, involuntary resettlement will be caused by the project. Additionally, a larger impact is expected for land-owners whose land will be partially acquired due to some features of the linear project. According to DFCCIL's "Section Wise Progress of Land Acquisition" as of August 31, 2010, it is expected that approximately 2,348 ha will be or has been acquired.</p>
22	Local economy such as employment and livelihood, etc.	A-/A+	A-	P	<p><Land acquisition> While detour route is applied to minimize the involuntary resettlement in the built-up area, the detour route will pass through agricultural land in most of the project area. Acquisition of the agricultural area for the Project would affect livelihood of a large number of farmers whose farmlands will be acquired.</p>
			B-	C	<p><Alteration to ground by cut land, filling, drilling, tunneling, etc.> <Construction of track, station, viaduct/bridges and other related facilities> <Traffic restriction in construction area> Overall construction activities and traffic restriction would affect local economic activities to some extent due to disturbance in smooth operation of commercial/public transportation during construction.</p>
			B+	C	<p><Deforestation / tree cutting> <Alteration to ground by cut land, filling, drilling, tunneling, etc.> <Construction of track, station, viaduct/bridges and other related facilities> Overall, the construction of the Project will provide more employment and business opportunities for local residents during construction.</p>
			A+	O	<p><Operation of trains> After operation of the DFC, regional economy particularly industrial sector in major industrial locations along the DFC would have positive impact due to improved freight transportation.</p>
23	(Surrounding) Land use and utilization of local resources	B-	B-	P	<p><Land acquisition> <Change of land use plan, control of various activities by regulations for the construction> Land use could worsen due to the acceleration of unplanned development along the proposed route and around new stations unless the land use is properly planned by the local government.</p>
			B-	O	<Operation of trains> - ditto -
24	Social institutions (including regional severance)	B-	B-	P	<p><Land acquisition> <Change of land use plan, control of various activities by regulations for the construction> Regional severance is expected due to construction of new freight tracks with mainly embankment structure as well as stations, viaduct/bridges and other related facilities.</p>
			B-	C	<p><Alteration to ground by cut land, filling, drilling, tunneling, etc.> <Construction of track, station, viaduct/bridges and other related facilities> <Traffic restriction in construction area> During construction, if access to the rest of the community is disturbed, social institutions could be temporarily disturbed.</p>
			B-	O	<p><Operation of trains> Regional severance is expected due to construction of new freight tracks, stations, viaduct/bridges and other related facilities.</p>

No.	Likely Impacts	Rating		Project phase	Explanation on Potential Impacts (Project-related activity is shown in the parenthesis "<>".)
		Overall	By project phase		
25	Existing social infrastructures and services	B-/C-	B-	P	<Land acquisition> Land acquisition for the project, involving relocation of public and/or community facilities, would affect local communities to some extent.
			B-	C	<Alteration to ground by cut land, filling, drilling, tunneling, etc.> <Construction of track, station, viaduct/bridges and other related facilities> <Traffic restriction in construction area> Construction work and traffic restriction would disturb access to existing social infrastructures and services.
			C-	O	<Operation of trains> Unless affected existing social infrastructure is replaced in a proper manner, nearby residents' access to existing social infrastructure will be negatively affected.
26	Socially vulnerable groups such as the poor, indigenous and ethnic people	C-	C-	P	<Land acquisition> Overall, it is expected that the poor, illegal occupants, small scale farmers, women headed households, and disabled persons would be affected by land acquisition and/or resettlement. The extent shall be studied through the RRP and public consultation meetings. As for the impact on indigenous and ethnic people, the potential impacts on the Scheduled Caste and Scheduled Tribes need to be studied in the RRP.
			C-	C	<Deforestation / tree cutting> <Alteration to ground by cut land, filling, drilling, tunneling, etc.> <Construction of track, station, viaduct/bridges and other related facilities> <Traffic restriction in construction area> Construction activities and traffic restriction would cause inconvenience to disabled persons in construction area.
			C-	O	<Operation of trains> The project would cause inconvenience to disabled persons during operation in the detour areas. Construction of RUBs in the detour areas should be considered as part of the Phase 1 project.
27	Misdistribution of benefit and damage	C-	C-	P	<Land acquisition> Inequality between beneficiaries of the Project (e.g. overall DFC owners/users) and the Project Affected Persons (PAPs) (e.g. affected land owners/users and nearby residents) would occur to some extent. The type and extent of the damage (negative impacts of the project) shall be studied and mitigated under the ESIA and RRP.
			C-	C	<Operation of trains> - ditto -
28	Historical and cultural heritage (including religious matters)	B-/C-	C-	P	<Land acquisition> Some existing historical, cultural and religious assets along the planned alignment and in proposed relevant facilities will be affected by the Project; however the number is not known and should be studied in the RRP.
			B-	C	<Operation of construction equipment and vehicles > Religious places which usually require silence might be affected by the noise and vibration of the construction equipment and vehicles. <Construction of track, station, viaduct/bridges and other related facilities> <Traffic restriction in construction area> Access to historical places, cultural, and religious places might be disturbed temporarily by construction activities and traffic restriction during construction.
			B-	O	<Operation of trains> Religious places near the freight railway and relevant facilities might be affected by the noise and vibration of the freight trains.
29	Water usage or water rights and rights of common	-	-	-	The impact on water usage is not directly relevant to the project except some limited amount of water will be used during construction.

No.	Likely Impacts	Rating		Project phase	Explanation on Potential Impacts (Project-related activity is shown in the parenthesis“<>”.)
		Overall	By project phase		
30	Local conflict of interests	C-	C-	P	<Land acquisition> Conflicts of interests related to the Project could occur among beneficiaries and the PAPs unless adequate RRP and public consultation are arranged.
			C-	O	<Operation of trains> - ditto -
31	Sanitation	B-	B-	C	<Construction of track, station, viaduct/bridges and other related facilities> Sanitary issues would occur in labor camp and neighboring areas in case sanitary facility is not adequately installed such as toilet and septic tank.
32	Hazardous (risk)infectious diseases such as HIV/AIDS	B-	B-	C	<Alteration to ground by cut land, filling, drilling, tunneling, etc.> <Construction of track, station, , viaduct/bridges and other related facilities> Risk of infectious diseases to laborers would be expected during construction due to the inflow of construction workers from outside the area.
33	Accidents	B-/B+	B-	C	<Deforestation / tree cutting> <Alteration to ground by cut land, filling, drilling, tunneling, etc.> <Operation of construction equipment and vehicles> <Construction of track, station, viaduct/bridges and other related facilities> Some accidents are inevitable during construction.
			B+	O	<Operation of trains> With a change of transport mode from freight trucks to railway system, a reduction of accidents would be expected in the long run due to a decrease in the number of freight trucks.
			B-	O	<Operation of trains> Some minor accidents are inevitable during operation.
34	Occupational safety	B-	B-	C	<Deforestation / tree cutting> <Alteration to ground by cut land, filling, drilling, tunneling, etc.> <Operation of construction equipment and vehicles> <Construction of track, station, viaduct/bridges and other related facilities> <Traffic restriction in construction area> Minor negative impacts on occupational safety are inevitable during construction; however, it will be secured in accordance with the domestic laws and regulations during construction.

Source: JICA Survey Team

2.5 POLLUTION CONTROL STUDY

2.5.1 Noise and Vibration

(1) Survey of Existing Circumstance

1) Railway and Background Noise and Vibration Survey

The background noise levels were measured in L_{Aeq} (sound exposure level) and vibration levels were measured in L_{peak} (maximum vibration level) at 16 sites relatively near the densely populated area during daytime. Together with background noise and vibration measurements, railway noise and vibration were also measured simultaneously using noise and vibration level meters at 2 points, i.e. at a distance of 12.5 m and 25 m from the center of the nearest railway track.

2) Survey of Sensitive Receptor and Land use

Survey of Sensitive Receptors (SRs) was conducted within a range of approximately 100 m from the center of the nearest railway track on one side (about 200 m at both sides).

Satellite imagery analysis and global positioning system (GPS) were used for land use identification.

(2) Results of the Survey

1) Background Noise and Vibration Level

The noise level at all the sites except Panvel (MAX 57 dB(A)) and Asaoti (MAX 59 dB(A)) is within the daytime ambient standard (55 dB (A)) of residential area in India. The results of vibration value indicated 30-40 dB, and below 55 dB which is the perceivable limit value.

2) Railway Noise (L_{AE} and L_{Amax}) and Vibration Levels from Existing Railway

The results of railways noise also indicated L_{AE} and L_{Amax} of different train type and direction of the trains, such as up and down directions. At the nearest measurement point from the railway, the range of 75 to 90 dB(A) as L_{Amax} and approximately 90 dB(A) as L_{AE} were measured. At that time, train's speed was almost 60 to 90 km/hr at each measurement site.

The railways vibration measured was below 70 dB at a distance of 12.5 m from the center of railway track. Hence, under the present situation, no serious damages of building due to railway vibration are expected.

3) Sensitive Receptor and Land Use

SRs located within 100 m from the center of the railway were extracted. Twelve SRs in Rewari-Dadri section, 100 SRs in Sections 3, 4 and 5, 20 SRs in Sections 1 and 2 have been identified respectively. Among these SRs, the closest one is located within 5 m or less from the proposed DFC rail in Rewari-Dadri section, and on the proposed DFC rail or within 5 m or less from DFC rail in Sections 3, 4 and 5, and within 10 m or less in Sections 1 and 2, respectively.

Agriculture is the main land use in Rewari–Dadri as well as JNPT-Vadodara sections. The length of DFC alignment which will pass thorough human settlement areas are approximately 67.3 km in Sections 3, 4 and 5, 54.2 km in Sections 1 and 2, and 6.5 km in Rewari-Dadri.

(3) Impact Assessment during Construction Phase

Construction of DFC structures and facilities would require the use of heavy equipment/vehicles, and adversely affect SRs. As for ROB construction areas, increase in noise and vibration level is possible because of the expected heavy traffic and operation of construction machineries due to construction works on the existing road. There are 77 ROBs proposed in this project. Eighteen of these are located on the parallel sections. There are 12 existing ROBs on the parallel section in Section-1, 3 on the parallel sections in Section-2, 2 in Section-3 and 1 in Section-4. There are no existing ROBs on the parallel sections in Section-5, Section-15 and Section-16.

Adequate measures will be planned and provided to reduce the negative impacts of noise and vibration pollution during construction stage, such as planning the deliberate and efficient use of equipment, use of low pollution-type machines, and regular maintenance of construction machines.

Since this impact is short duration, direct, temporary and reversible, it can be considered minor if mitigation measures and site management practices are applied.

(4) Impact Assessment during Operation Phase

1) Procedure of Prediction and Evaluation of Railway Noise and Vibration

Prediction and evaluation of railway noise and vibration from passing freight trains have been carried out for each of the selected SR sites based on the procedure of prediction and evaluation as shown in Figure 2.2. For evaluation of the predicted noise and vibration levels, the following standards were taken into consideration in the ESIA study:

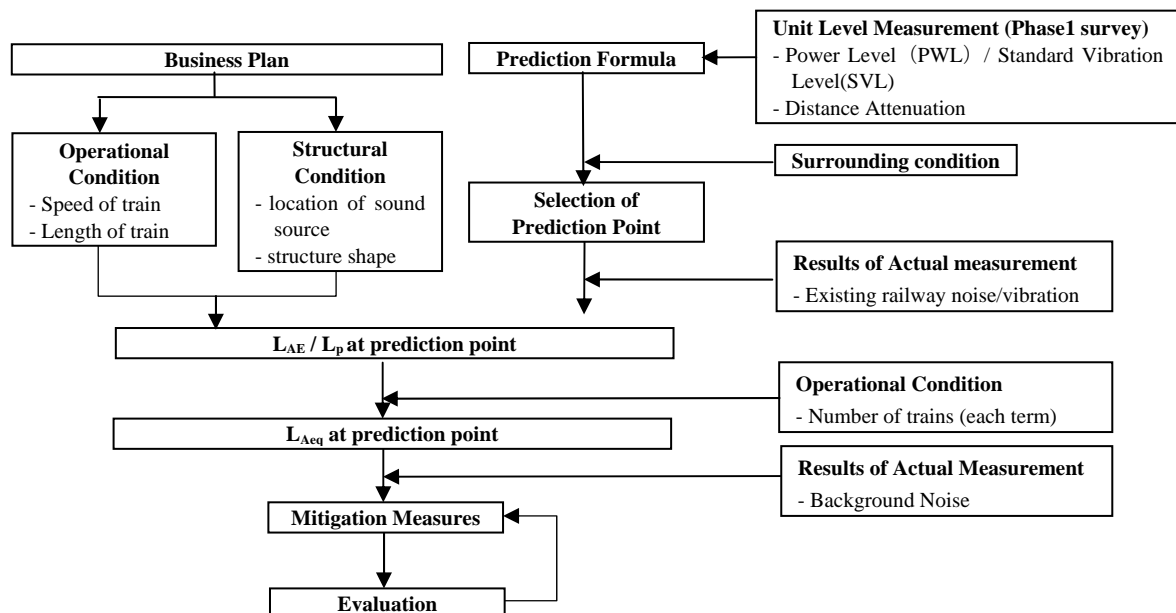
- Guidelines for Countermeasures for Railway Noise in Case of New Constructions and Large-scale Improvement of Existing Railways, Environmental Agency of Japan, 1995;
- Guideline Value of Vibration from Shinkansen Super Express Railway in Japan, Environmental Agency of Japan, 1976;
- The Noise Pollution (Regulation and Control) Rules, 2000.

2) Results of Prediction

a) Parallel Section

The predicted future noise levels (L_{Aeq}) at 30 m and 50 m distances, which is the estimated average ROW limit from the center of existing railway tracks in the parallel sections range from 57 to 71 dB(A) during the day, and 55 to 71 dB (A) at night at 30 m, then 55 to 70 dB(A) during the day, and 54 to 70 dB (A) at night at 50 m.

The result of the predicted vibration levels of the existing railway ranges from 42 to 64 dB (Z-axis) at 30 m, and 41 to 61 dB (Z-axis) at 50 m. The result of the predicted vibration levels of the DFC railway ranges from 57 to 70 dB (Z-axis) at 30 m, then 55 to 69 dB (Z-axis) at 50 m.



Source: JICA Survey Team

Figure 2.2 Procedure of Prediction and Evaluation of Noise and Vibration Levels

Table 2.7 Location of Railway Noise and Vibration Prediction

Section	Prediction Location	Background Noise Levels used	Result of Existing Railway Noise Measurement (L_{AE} Number of Freight Trains)
Parallel section	Panvel	Panvel	Panvel
	Kopar	Panvel	Panvel
	Palgar	Palgar	Palgar
	Boisar	Boisar	Boisar
	Vapi	Vapi	Vapi
	Valsad	Valsad	Valsad
	Amalsad	Amalsad	Amalsad
	Navsari	Amalsad	Amalsad
	Kim	Kim	Kim
Detour section	Asaoti	Asaoti	Asaoti
	Bharuch	Kim	-
	Miyagan	Kim	-
	Sohona	Asaoti	-
	Tigaon	Asaoti	-

Source: JICA Survey Team

b) Detour Section

The predicted noise level (L_{Aeq}) at 30 m and 50 m from the center of DFC alignment ranges from 54 to 57 dB(A) during the day, and 54 to 57 dB () at night at 30 m, and 53 to 56 dB(A) during the day and at night at 50 m. The result of the predicted vibration levels of the DFC railway is 63 dB (Z-axis) at 30 m, and 59 dB (Z-axis) at 50 m.

(5) Evaluation

1) Setting of Environmental Preservation Target

a) Parallel Sections

For parallel sections, it is targeted that predicted noise levels which consists of DFC railway noise levels and existing railway noise levels meet guideline values at 30 m and 50 m from the center of existing railway where ROW might be located. As a result, the predicted values don't meet the guideline values (daytime: 60 dB(A), nighttime: 55 dB(A)) in all location except Kopar point. In fact, the result also indicates that railway noise levels from the existing railway track already exceed the recommended level for half of the sites during the night. Therefore, environmental impact due to railway noise is judged to be significant. Therefore, some mitigation measures are recommended to be taken especially along the residential areas and near the sensitive receptors.

It is targeted that predicted vibration level (L_p), which consists of DFC railway vibration and existing railway, should meet guideline values (70 dB) at 30 m and 50 m from the center of DFC embankment where the ROW might located. In all of the prediction locations, predicted values meet the guideline values. Therefore, environmental impact due to railway vibration is judged to be light.

b) Detour Sections

For detour sections, it is targeted that predicted noise level, which consists of DFC railway noise level, should meet the guideline values at 30 m and 50 m from the center of DFC alignment where ROW might be located. As a result, predicted values slightly exceed the guideline value in Sohona and Tigaon at night. However, in other sites, predicted noise level (L_{Aeq}), which consists only of DFC railway noise levels meet the guideline values at each prediction point and at each time. Therefore, environmental impact due to railway noise is judged to be light.

It is targeted that predicted vibration level (L_p), which consists of DFC railway vibration only, should meet the guideline value (70 dB). In all the prediction locations, predicted values meet the guideline values. Therefore, environmental impact due to railway vibration is judged to be light.

c) Sensitive Receptor

For parallel sections, it is targeted that predicted noise levels which consists of DFC railway noise and existing railway noise, should meet the guideline value within 100 m from the center of the existing railway. For the detour sections, it is targeted that predicted noise level, which consists only of DFC railway noise, should meet the guideline value within 100 m from the center of the DFC railway. As a result, regarding the above a) and b) evaluation for parallel sections, noise level did not meet the guideline level and this is also true for some points of the detour section. Therefore, environmental impact due to railway noise is judged to be significant.

2) Consideration of Environmental Mitigation Measures

Regarding environmental preservation, in parallel sections, it is necessary to establish soundproof walls. In detour sections, residential areas are already considered for setting-up of soundproofing solutions. Although the result of the study of predicted noise levels meets environmental preservation target, the construction of soundproof walls and limitation of train operations at night should be considered.

a) Case Studies on Construction of Soundproof Walls

If ROW is set at 30 m from the center of the railway track, the soundproof walls with a height of 0.5 m (Kopar) to 4.0 m (Panvel, Palgar and Amalsad) may be required at parallel sections and from 0.5 m (Tigaon) to 1.0 m (Sohona) may be required at detour sections. On the other hand, if the ROW is set at 50 m from the center of the railway track, soundproof walls with a height of 0.5 m (Panvel, Kopar and Asaoti) to 4.0 m (Valsad) may be required at parallel sections and 0.5 m (Sohona) may be required at detour sections.

b) Case Studies on Shifting Train Operation Number from Night to Day Time

For the detour sections where the guidelines were exceeded (Sohona, Tigaon), a consideration of shifting some of the night trains to daytime was made without changing the total number of daily scheduled trains. Supposing that ROWs were set at 30 m away from the center of DFC railways, shifting 22 night trains to daytime at Sohona, 16 night trains to daytime at Tigaon are required. If ROW is set at 50 m away from the center of the DFC railways, 7 night trains are required to be shifted to daytime at Sohona.

2.5.2 Water Pollution

(1) Survey of the Major River Water Quality

Water quality survey was conducted to study baseline information in 15 important rivers at bridge construction sites in order to suggest preventive measures to avoid adverse effects to the water quality during bridge construction and afterwards.

(2) Analysis of Results

Analysis of water quality results of the first season or wet season, the second season or dry season, together with the available secondary data for all important rivers indicate a high fluctuation in test values for important parameters in different seasons in a year as shown

in Table 2.8. This may be attributable to changes in temperature and flow conditions, variation in activities in catchment area, and low dilution of receiving water body, especially in dry season.

Table 2.8 Summary of Water Quality Results Analysis for Major Rivers

Major Rivers	Water Quality Analysis	
	Wet Season	Dry Season
Yamuna	<ul style="list-style-type: none"> -DO from 3.9 to 5.8 mg/L -BOD from 3.2 to 4.2 mg/L -Free ammonia from 2.16 to 2.21 mg/L 	<ul style="list-style-type: none"> - DO values near zero -BOD from 57.1 to 64.5 mg/L -Free ammonia from 5.81 to 6.02 mg/L
	<p>Results show a high degree of pollution level in this particular stretch of the river. In wet season, the river banks were muddy due to deposited silt. Oil and grease, heavy metals and inorganic contamination still on the higher side although not exceeding the limits. Water quality also shows impacts of faecal contamination and direct disposal of sewage into the river.</p>	
Hindon	<ul style="list-style-type: none"> -Turbidity from 147 to 158 NTU -DO from 3.3 to 3.5 mg/L with BOD around 4.1 to 6.0 mg/L -No heavy metals contamination -Free ammonia from 1.94 to 2.2.3 mg/L 	<ul style="list-style-type: none"> -Turbidity from 143 to 174 NTU -DO level was near zero with BOD values 36.4 to 44.4 mg/L -No heavy metals contamination -Free Ammonia from 3.35 to 3.72 mg/L
	<p>Overall water quality shows heavy impact of faecal contamination and direct disposal of untreated and partially treated sewage.</p>	
Daman Ganga	<ul style="list-style-type: none"> -BOD from 0.6-19.8 mg/L -Turbidity from 18 to 179 NTU within 400 meter distance from upstream (u/s) to downstream (d/s) -Free Ammonia from 1.4 to 4.18 mg/L from u/s to d/s location -No heavy metal contamination 	<ul style="list-style-type: none"> -BOD from 4.0-10.3 mg/L -Turbidity from 14 to 58 NTU -Free Ammonia from 1.6 to 1.8 mg/L -No heavy metal contamination
	<p>-The results show not only tidal influence but also the effect of discharge from an outfall of a sewage treatment plant, particularly during wet season in the downstream direction. -pH and DO meet the water quality criteria in dry season for all three sampling locations but only at the center during the wet season. -Mostly, BOD, conductivity and Free Ammonia do not conform to the criteria in both the seasons. BOD meets the criteria for locations at upstream and center during wet season. -High fluctuations in certain parameters indicate the need for more rigorous spatial sampling for these locations. -The dry season results show favorable value of DO for aquatic biota. An impact of effluent on water quality was low due to dilution with tidal water.</p>	
Par	<ul style="list-style-type: none"> -DO levels below the permissible limits required for aquatic biota and bathing standards. -BOD values comparatively lower -TDS, TSS and hardness values comparatively lower -Turbidity from 96 to 112 NTU -Free Ammonia from 1.64 to 2.11 mg/L -High level of Faecal Coliform and Total Coliform. 	<ul style="list-style-type: none"> -DO levels below the permissible limits required for aquatic biota and bathing standards. -BOD values are significantly higher and are a clear indication of mixing of untreated sewage or effluent near the sampling locations. -TDS, TSS and hardness values are comparatively much higher due to less dilution conditions -Turbidity from 282 to 342 -Free Ammonia from 4.00 to 4.90, which is beyond permissible limit for designated best use for propagation of wild life and fisheries -High level of Faecal Coliform and Total Coliform.
	<p>-EC values for both seasons also show a high influence of sea water on the overall quality of river water at proposed bridge site locations.</p>	
Auranga	<ul style="list-style-type: none"> -pH and DO meet the water quality criteria -BOD and Free Ammonia do not conform to the criteria -EC and corresponding TDS values are well within the prescribed limits -Faecal Coliform and Total Coliform counts far exceeding the permissible limit -For other inorganic parameters, the values are well within the permissible limits. -No heavy metal contamination 	<ul style="list-style-type: none"> -pH and DO meet the water quality criteria -BOD and Free Ammonia do not conform to the criteria. However, BOD values are only marginally higher than the permissible limits. -EC and corresponding TDS values are well within the prescribed limits but much higher than wet season. This clearly shows the influence of sea water into the quality of river water. -Faecal Coliform and Total Coliform counts far exceeding the permissible limit -For other inorganic parameters, the values are

Major Rivers	Water Quality Analysis	
	Wet Season	Dry Season
		well within the permissible limits. -No heavy metal contamination
North and South Kaveri	-pH, EC and DO meet criteria -BOD values are close to permissible limits -Free Ammonia does not conform to the criteria -Faecal Coliform and Total Coliform counts are far exceeding the permissible limits -Turbidity from 84 to 130 NTU -No heavy metal contamination	-pH, EC and DO meet criteria -BOD values exceeding the limits -Free Ammonia does not conform to the criteria -Faecal Coliform and Total Coliform counts are far exceeding the permissible limits -Turbidity values range from 84 to 130 NTU -No heavy metal contamination
Ambika	-Overall water quality is fairly good -Faecal Coliform and Total Coliform counts are exceeding the permissible limits -No heavy metals contamination	-BOD and Free Ammonia do not meet the criteria -Faecal Coliform and Total Coliform counts are exceeding the permissible limits -No heavy metals contamination
N. Poorna	-pH, conductivity, DO and BOD are meeting the water quality criteria -Free Ammonia does not conform to the criteria -BOD value from 2.2-2.9 mg/L -Faecal Coliform and Total Coliform counts are exceeding the permissible limit of water quality criteria for bathing reaches in river, thereby indicating contamination due to domestic wastewater -No heavy metals contamination	-Only pH and conductivity are meeting the criteria -Free Ammonia does not conform to the criteria -BOD value from 18.0-19.5 mg/L -Faecal Coliform and Total Coliform counts are exceeding the permissible limit of water quality criteria for bathing reaches in river, thereby indicating contamination due to domestic wastewater. -No heavy metals contamination
Mindhola	-DO values are very low indicating less aeration capacity as well as high degree of pollution. -BOD value from 12.3 to 12.6 mg/L -pH and EC are well within limits -Total Coliform and Faecal Coliform contamination is also very high in all the sampling locations. -No heavy metal contamination	-DO values are very low indicating less aeration capacity as well as high degree of pollution. -BOD value from 14.3 to 16.7 in dry season. -pH and EC are well within limits - Total Coliform and Faecal Coliform contamination is also very high in all the sampling locations -No heavy metal contamination
Tapi	-pH, conductivity, DO and BOD are meeting the water quality criteria but Free Ammonia does not conform to the criteria -BOD values from 0.5-0.8 mg/L -Faecal Coliform and Total Coliform counts are exceeding the permissible limits -Turbidity and TSS are in low concentration as compared to other important rivers along the alignment. -No heavy metal contamination	-Only pH, conductivity, DO and Free Ammonia are meeting the criteria -BOD values from 3.9-6.5 mg/L -Faecal Coliform and Total Coliform counts are exceeding the permissible limits -Turbidity and TSS are in low concentration as compared to other important rivers along the alignment. -No heavy metal contamination
Narmada	-pH, EC, DO and BOD are meeting the water quality criteria -BOD values are within limits -Free Ammonia does not conform to the criteria. -Faecal Coliform and Total Coliform counts are exceeding the permissible limits -Lower TDS and TSS values	-Only pH and EC are meeting the criteria -BOD values from 9.3-12.2 and are beyond the permissible limits. -Free Ammonia does not conform to the criteria. -Faecal Coliform and Total Coliform counts are exceeding the permissible limits -Lower TDS and TSS values as compared to other tidal water affected rivers along the alignment
North and South Vaitarna	-pH and DO meet the water quality criteria whereas BOD, conductivity and Free Ammonia do not conform to the criteria -BOD values range from 18.4 to 21.9 mg/L in South Vaitarna River and 17-20.3 mg/L in North Vaitarna River. -Faecal Coliform and Total Coliform counts are far exceeding the permissible limits -High values of EC and TDS in both seasons mainly due to inter-mixing of sea water into the fresh river water due to the creek area	-pH and DO meet the water quality criteria whereas BOD, conductivity and Free Ammonia do not conform to the criteria -BOD values from 9.7-10 mg/L for South Vaitarna River and 4.4-6.9 mg/L for North Vaitarna River. -Faecal Coliform and Total Coliform counts are far exceeding the permissible limit -The higher values of EC and TDS are due to low flow conditions and more impact of sea water.
Ulhas	-pH and conductivity are meeting the water quality criteria whereas BOD, DO and Free Ammonia do not conform to the criteria	-pH and conductivity are meeting the water quality criteria whereas BOD, DO and Free Ammonia do not conform to the criteria

Major Rivers	Water Quality Analysis	
	Wet Season	Dry Season
	-BOD values from 8.6-10.4 mg/L -Faecal Coliform and Total Coliform counts are far exceeding the permissible limit -Turbidity ranges from 43 to 56 NTU -No heavy metal concentration	-BOD values from 7.1-9.7 mg/L -Faecal Coliform and Total Coliform counts are far exceeding the permissible limit -Turbidity ranges from 57 to 71 NTU. -No heavy metal concentration

Source: JICA Survey Team

(3) Impact Assessment

The most significant impact anticipated from bridge construction activities would be increased turbidity due to earth works in the rivers which causes decrease in photosynthesis and primary productivity process. Silt in the river water during construction phase needs to be minimized. The organic and bacterial loads continue to be critical in all the important rivers. Site drainage and wastewater from toilets and washrooms would pollute surface water if discharged without adequate treatment. Therefore, during construction, special care should also be taken so that wastewater from the labour camps and construction sites do not discharge directly into the rivers.

2.5.3 Air Pollution

The freight corridor would improve air quality along the proposed areas by reducing the emissions from vehicular traffic and traffic congestions. The only time when air pollutants are emitted is during the construction of the freight corridor. The pollution caused during construction activities is only temporary.

2.5.4 Soil Contamination

During construction phase, soil contamination is likely to take place due to leakage of asphalt emulsifier at road pavement. Soil contamination may also take place during filling of oil in vehicles or leakage from vehicles. For this, asphalt emulsifier will be handled with caution and any leakage detected should be immediately rectified.

2.5.5 Waste

Under the existing planning phase, types of construction waste which are expected to be generated are asphalt chunks, chunks of concrete, surplus soil, construction scrap materials and others. The amount and percentage composition of construction waste are not clear in this phase. However, surplus soil is planned to be reused as much as possible in construction of the DFC embankment. In addition, all other construction wastes are also planned to comply with relevant Center or State laws pertaining to waste management.

2.5.6 Bottom Sediment

During construction of the bridges over the rivers, sediment pollution may occur. As one of the mitigation measures, silt fencing will be provided to restrict runoff into the water during construction phase.

2.5.7 Electromagnetic Radio Wave Interference

In case of parallel section, vertical alignment of DFC may be designed to be at the same level as the existing railway/ground level to reduce any modifications. In case of detour section, most of the filling bank may be designed such that the height is less than six meters, and this is suitable for a base of the ground-two building. Therefore, it is predicted

that there are no negative impact to the residential areas along the proposed DFC alignment.

2.5.8 Obstruction of Sunlight

In case of parallel section, vertical alignment of DFC may be designed to be at the same level as the existing railway/ground level to reduce any modifications. In case of detour section, the shade of DFC structure might be predicted in the ROW. Therefore it is predicted that there are no negative impact to the residential areas along the proposed DFC alignment.

2.5.9 Disasters

Seismic factors should be appropriately incorporated in the civil and structural designs of major structures in the DFC Project. Adequate cross drainage channels (longitudinal and median drains) should be provided along the DFC alignment at suitable locations for the smooth passage of surface run-off to prevent flooding.

2.6 NATURAL ENVIRONMENTAL STUDY

2.6.1 Flora

(1) Study Methodology

The field survey was conducted in all identified 'Recorded Forest Area' in the JNPT-Vadodara and Rewari-Dadri sections so that an accurate assessment of the status and likely potential impacts on fauna and flora could be made.

In this study, the vegetation and faunal surveys in the forests to be affected by the project were conducted in the winter, and summer seasons. The actual survey periods were determined based on the common classification of the Indian Meteorological Department (IMD) i.e. January-February for winter months, March - May for pre-monsoon (summer) months, June - September for monsoon season (southwest monsoon season) and October - December for post-monsoon season.

Supplemental (Monsoon) survey was also conducted from August to September 2011 to confirm the presence of any critical (rare/endangered/endemic) species in the survey area based on the results of the previous surveys in winter and summer seasons and recheck the status with IUCN, RET¹ species and WPA India.

(2) Major Findings

1) JNPT-Vadodara Section

a) Overall situation

Approximately 45,000 trees will be required to be removed for the corridor in the JNPT-Vadodara section. The census was carried out for a 60-meter strip along the alignment, i.e., within the ROW. For each of the districts, the estimated number of trees to be removed is provided in Table 2.9. Bharuch District has the highest number of trees within the ROW. In addition, there are only few mangrove areas in the Proposed DFC alignment.

¹ RET refers to rare, endangered and threatened species

Table 2.9 Tree Census in JNPT - Vadodara Section

District	No. of Trees
Vadodara	2,376
Surat	5,490
Bharuch	22,332
Navsari	1,193
Valsad	2,940
Thane	9,915
Raigad	951
Total	45,197

Source: JICA Survey Team

b) Protected Areas: SGNP

The proposed corridor area touches the northern boundary of the SGNP near the Kaman Station. There is one existing railway track and on the other side is the National Highway. The result of field survey of flora in the SGNP is shown in Table 2.10.

Table 2.10 Result of Field Survey on Flora in Sanjay Gandhi National Park Area

Season	Description
Winter	The villages of Nagale, Shilottar, Sarjamori (Thane District) are located along the northern boundary of SGNP. Within the area, two sites were surveyed in winter season (January). Three tree species, Two herbal species, three grass species i.e., eight flora species in total were found in the Shilottar village forest area. Nine tree species, one shrub species, eight herbal species, four grass species, two climber, one woody climber species i.e., 25 species in total were found in the Sarjamori village forest area. An endangered tree species, <i>Sterculia urens</i> was found in Sarjamori.
Summer	In the summer season (April) survey, three sites were surveyed within the area. In Nagale village forest area, three tree species, one shrub species, one herbal species i.e., five species in total were found at the site. Three tree species, two herbal species, three grass species and eight species in total were found in Shilottar village forest area. Seven tree species, two shrub species, three herbal species i.e., twelve species in total were found in Sarjamori village forest area including an endangered tree species, <i>Sterculia urens</i> .

Source: JICA Survey Team

c) Forest area

The result of field survey of Flora in Forest area is shown in Table 2.11.

Table 2.11 Result of Field Survey on Flora in Forest Area

No.	Forest Area	Description
1	Ovali Reserved Forest	A total 18 of species were recorded in Ovali. The forest is located on the north side of the existing railway. Total length of approximately 350 m and 0.1288 ha of the land is likely to be affected by conversion to railway. The area is dominated by herbal and grass plant species with no endangered or otherwise protected species.
2	Nagale Forest	Nagale forest plot falls within SGNP. Total length of approximately 95 m is located adjacent to the north side of the existing railway. The area is dominated by herbal and grass plant species with no endangered or otherwise protected species.
3	Sarjamori Forest	The forest is located within SGNP. Total length of approximately 110 m is located adjacent to the north side of the existing railway. One Endangered plant species, <i>Sterculia urens</i> (Sarjamori) was found in the area.
4	Shilottar Forest	Shilottar area forest plot falls within SGNP. Total length of approximately 108 m is located adjacent to the north side of the existing railway. The following tree species: <i>Aplauda mudica</i> , <i>Azadirachta indica</i> , and <i>Bauhenea racemosa</i> were observed in Shilottar forest plot. Herbal and grass plant species were only observed in the winter season.
5	Dhaniv Forest	In Dhaniv forest plot, eight plant species were recorded and classified below. No endangered species were found in the field survey at this site during both seasons.
6	Bhatpada Forest	Thirteen plant species in winter and six species in summer were observed during the field surveys. No endangered species were found in the field survey at this site during both seasons.

No.	Forest Area	Description
7	Bilalpada Reserved Forest	A total of eight species were recorded in Bilalpada. No endangered species were found during the field survey at this site during both seasons.
8	Kasarali Forest	A total of nine species were recorded in Kasarali forest area. Mangrove vegetation is also found in the lowland area of this village. No endangered species were found in the field survey at this site during both seasons.
9	Kelve Road Forest	Very little vegetation was observed. The forest land area can be described as open scrub or barren land. Only 3-4 plant species were noted. No endangered species were found in the field survey at this site during both seasons.
10	Kasbe Mahim Forest	The Mahim plot of forest land area is open scrub and no vegetation was recorded. No endangered species were found in the field survey at this site during both seasons.
11	Dandipada Forest	There are no trees in Dandipada forest plot, only invasive species and grasses were recorded. No endangered species were found in the field survey at this site during both seasons.
12	Boisar Forest	Boisar Forest is categorized as protected forest. The area is characterised by open, barren land with no vegetation cover present. No endangered species were found in the field survey at this site during both seasons.
13	Rani Shirgaon Forest	A total of 13 species were recorded in Rani Shirgaon. No endangered species were found in the field survey at this site during both seasons.
14	Kolavali Forest	Nine plant species in winter and six species in summer were recorded in the field survey at Kolavali. No endangered species were found in the field survey at this site during both seasons.
15	Vangaon Forest	Vangaon village forest area is categorized as protected forest. <i>Acacia auriculiformis</i> , <i>Agave americana</i> , <i>Lantana camara</i> and <i>Zizyphus oinoplia</i> were recorded in Vangaon. No endangered species were found in the field survey at this site during both seasons.
16	Pade Forest	This site is characterized by sparse mangrove vegetation. Only one tree species in winter and three plant species were recorded in the field survey. No endangered species were found in the field survey at this site during both seasons.
17	Ambevadi Forest	Two species in winter and nine species in summer were recorded in field surveys.
18	Gholvad Forest	Gholvad forest area is parallel to the existing track. Bushes, grasses and a few tree saplings were recorded in the alignment area. <i>Acacia leucocephala</i> and <i>Phoenix sylvestris</i> and <i>Prosopis juliflora</i> were among the recorded species during the survey. No endangered species were found in the field survey at this site during either season.
19	Bordee Forest	During the field surveys nine plant species in winter and five species in summer were recorded in Bordee forest plot. No endangered species were found in the field survey at this site during both seasons.

Source: JICA Survey Team

2) Rewari-Dadri Section

a) Overall situation

Based on the Rewari-Dadri section tree census, it is estimated that a total 3,100 trees are located in the corridor and will require cutting of felling as shown in Table 2.12. The Reserved Forest area of Gulistanpur is dominated by *Prosopis juliflora*, *Dalbergia sissoo* and *Butea monosperma*. The corridor will bisect the reserved forest.

Table 2.12 Tree Census in Rewari-Dadri Section

S.No.	District	No. of Trees
1	Rewari	415
2	Alwar	146
3	Mewat	350
4	Gurgaon	253
5	Palwal	216
6a	Faridabad	1,066
6b	Faridabad-new	520
7	Gautam Buddha Nagar*	134
	Total	3,100

Note:*Does not include the reserved forest trees.

Source: JICA Survey Team

b) Forest Areas: Gulistanpur Reserved Forest

The Gulistanpur Reserved Forest is located close to the industrial area of Surajpur and is not a natural forest but a result of plantation work by the forest department. Mainly *Prosopis juliflora*, *Acacia arabica*, *Dalbergia sissoo*, *Butea monosperma* and *Calotropis procera* were observed. The corridor will pass through 1.6 km of the reserved forest and it is estimated that a total of 476 trees will be cut. The maximum number of trees expected to be removed are *Prosopis juliflora* (310), followed by *Dalbergia sissoo* (115), *Butea monosperma* (51) and *Acacia arabica* (13). However, this plantation forest consists mainly of semi-arid and arid plants for greenery development, there is no critical habitat.

(3) Impact Assessment

1) Impacts

a) Overall Impact

A total of 133 plant species were recorded in the two season survey.

Winter season (January) as well as summer season (April) analysis reveals that biodiversity is low in the village forest area falling in the proposed corridor.

Species diversity in the winter season was higher than in the summer season.

The village forest areas of Gholvad, Kolavali, Bilalpada and Sarjamori contained the greatest species diversity although the Gulistanpur Reserve of Gautam Buddha Nagar exhibited the highest species diversity of all the sites surveyed.

The proposed DFC Project will have a minor impact on forest ecosystems and the natural environment in the Vasai detour village forest areas.

In other village forest areas, the DFC Project will also only have a minor impact on the natural environment as these areas are not rich in vegetation cover.

b) Loss of forest cover/tree cover

Loss of forest cover/tree cover due to cutting of private and government trees within the proposed ROW is anticipated. Approximately 45,000 trees in JNPT-Vadodara section and 3,100 trees in Rewari-Dadri section are required to be cut, although there is only one endangered species.

c) Diversion of forest land

It is estimated that, approximately 32 ha of forest land in the JNPT-Vadodara section and 10 ha in Rewari-Dadri section will be converted for use as ROW for the DFC. The area includes the outer part of the SGNP and other recorded forests.

2) Mitigation measures

a) Loss of forest cover/tree

Tree cutting is to proceed only after all the legal requirements including Formal Clearances are completed and a subsequent written order is issued to the Project Proponent/ Contractor.

Appropriate compensatory plantation should be carried out to compensate for the vegetation loss due to cutting of trees for site clearing. For trees to be cut, sufficient

compensatory plantation, about two times the number of trees felled, will be carried out. If adequate space for compensatory plantation is not available along the DFC Corridor, plantation may be carried out along State Highways (SH), Major District Roads (MDR), and Other District Road (ODR) or in degraded forest land.

For trees to be cut in private land, compensation for land and trees will be given to the owners. The rate of compensation for trees lost will be decided by the State Forest Department.

Compensatory afforestation and reforestation will follow preferences for mixed plantations consisting of flowering shrubs and evergreen ornamental trees with less timber and fruit value. Under the plantation programme, more valuable tree species will be planted in place of existing non-valuable mono crops in the project area, where appropriate.

b) Diversion of forest land

Monetary compensation should be provided to Forest Department towards the cost of forest land to be diverted and compensatory afforestation.

Before starting any activity within the Forest area, Forest Clearance must be obtained as per the Forest Conservation Act, 1980 and its amendments from the State Forest Department.

An action plan for tree cutting should be prepared to avoid uncontrolled and indiscriminate tree cutting. Appropriate compensatory plantation should be initiated to compensate for the vegetation loss due to cutting of trees for site clearing. For trees to be cut, sufficient compensatory plantation should represent approximately 2 times the number of trees felled.

Preferential mixed plantation consisting of flowering shrubs and evergreen ornamental trees with less timber and fruit value should be carried out. Under the plantation programme, more valuable tree species should be planted in place of existing non-valuable mono crops in the project area, if any.

2.6.2 Fauna

(1) Study Methodology

Fauna species were also surveyed in the same forest areas of Thane, Raigad and G. B. Nagar districts as for the flora species and in the same seasons.

(2) Major Finding

1) JNPT- Vadodara section

a) Overall situation

The major fauna species in the districts studied includes: Blue bull (Nil gai), Jungle cat, Jackal (Shiyal), Indian Fox (Lomdi), Common Langur (Hanuman langur), Indian Rat Snake (Dhaman), Checkered Keel back (Dendavo), Common Indian Krait (Kadotaro), Common cobra (Nag), Red sand Boa (Andhadi chakad), Pale Hedgehog (Shelo), Common mongoose (Noliyo), Indian Porcupine (Shahudi), Indian Hare (Sasalu), Indian Flying fox (Vagol), Indian Cricket Frog, Indian palm squirrel, Indian mud or lap shell turtle (Kacher), and Common Indian Monitor (Patala Gho) Marsh crocodile.

In terms of avifauna the species commonly found were: Asian koel, Rose-ringed parakeet, White-breasted kingfisher, pied kingfisher, Small blue kingfisher, Small bee eater, Common hoopoe, Common golden backed woodpecker, Coppersmith barbet, Black drongo, Common myna, House crow, Red vented bulbul, Common babbler, Purple sunbird, White wagtail, Yellow wagtail, Baya weaver, and House sparrow.

b) Protected Areas: SGNP

In the Diva - Vasai Section, the alignment of the proposed corridor has been planned parallel to the existing railway track with a view to utilising the available railway land to the fullest extent and minimize acquisition of additional land. Near the villages listed below, all efforts to ensure that the track runs outside the SGNP have been taken. However, existing track safety and geological considerations require the proposed line to be near the existing line. Nagale, Shillotar, Sarjamori and Mori village forest areas will have minor additional impacts due to the proposed corridor. A total of 1.823 ha from the village forest area (Reserved Forest) is expected to be affected.

c) Forest areas

During the field survey, movement of some mammal species was confirmed in the forest areas very near the existing railway. The summary of fauna species recorded in the forest areas of Thane and Raigad is provided in Table 2.13.

Table 2.13 Total Number of Species in Major Fauna Classes along the Proposed Section

No.	Forest Village	Winter				Summer			
		Reptiles	Birds	Mammals	Total	Reptiles	Birds	Mammals	Total
1	Ovali	7	30	6	43	3	26	3	32
2	Nagala (SGNP)	-	-	-	-	3	24	6	33
3	Sarjamori (SGNP)	10	48	12	70	8	25	7	40
4	Shilottar(SGNP)	10	48	11	69	5	27	6	38
5	Dhaniv	7	27	4	38	5	26	2	33
6	Bhatpada Dandipada	7	29	6	42	7	20	4	31
7	Bilalpada	7	29	6	42	8	24	6	38
8	Kasarali	7	28	7	42	5	26	6	11
9	Kelve road	7	32	5	44	3	18	3	24
10	Kasbe Mahim	8	23	5	36	4	24	1	29
11	Dandipada	7	36	4	47	3	27	3	33
12	Boisar	7	23	5	35	7	19	2	28
13	Rani Shirgaon	7	21	5	33	7	24	1	32
14	Kolavali	7	20	5	32	8	20	8	36
15	Vangaon	7	42	4	53	3	19	4	26
16	Pade	7	20	4	31	3	19	2	24
17	Ambevadi (Protected Area)	7	40	5	52	3	23	4	30
18	Gholvad	6	35	5	46	8	20	4	32
19	Bordee	8	34	7	49	7	23	11	41

Source: JICA Survey Team

2) Rewari-Dadri Section

a) Overall situation

In the Rewari-Dadri section, the proposed track is a detour where the alignment mainly goes through agricultural areas. Spotted Deer, Sambar, Blue Bull, Leopard, Caracal, Rusty Spotted Cat, Jungle Cat, Four-horned Antelope, Wild Boar, Jackal, Striped Hyena are some of the larger mammal species found in the forests of Alwar. Among bird species, Peafowl, Grey Partridge, Bush Quail, Sand Grouse, Tree Pie, Golden backed Woodpecker, Crested Serpent Eagle and Great Indian horned Owl are common.

b) Forest areas: Gulistanpur Reserved Forest

The wide range of hardy vegetation species in the reserve despite being surrounded by an area of heavy industry, is identified but it is this biodiversity that enables resilience. The plantation forest of Gulistanpur is thorny and bushy. Gulistanpur is the only area in Gautam Buddha Nagar. Tourism infrastructure has been developed in the area.

(3) Impact Assessment

1) Impacts

During the field survey, movements of some mammal species was confirmed in the forest areas very near the existing railway. This may mean that animals may be hit by passing trains. Adequate measures should be considered to separate fauna from the railway by fencing and construction of an underpass in the national park.

Habitat loss in Raigad mangrove area is expected. Similarly, mangrove vegetation near the Ulhas River and Vaitarna bridge construction sites, Pade and Kasarali Villages in Thane District are also expected to be affected during the construction phase.

Minor losses are expected in forest villages of Thane, as the majority of the area do not have dense vegetation.

At the Gulistanpur Reserved Forest, the proposed corridor passes through the middle of the entire forest area and is likely to affect animal movement in the forest land requiring adequate separation and passageways to avoid traffic accidents at the start of operations.

2) Mitigation Measures

Fencing and development of safe passages for wildlife and local residents should be provided.

Detailed study of the protected area (SGNP) should be conducted to ascertain the future development aspects so that plans can be prepared in a timely fashion to avoid habitat loss and minimise stress.

The proposed corridor is likely to affect the Gulistanpur Reserved Forest area as the alignment route bisects the forest area. Therefore, immediate action should be taken to compensate by means of a new plantation in the open scrub area adjacent to the reserve so that loss of habitat can be minimized.

2.6.3 Eco-Sensitive Area

(1) Dahanu Taluka Eco-sensitive Area

1) Existing condition

The study area was located in Vasai Taluka of Thane District. The length of the tunnel is 540 m. The summary of observation and impact matrix is shown in Table 2.14.

Table 2.14 Summary of Observation and Impact Matrix for Dahanu Taluka Eco-Sensitive Area

No	Issues	Observations	Significance of Impact
1	Topography and Drainage	DFC alignment will pass through a valley surrounded by denuded hills. One closed tunnel with a length of 540 m and the other open cut have been proposed to cross over two nearby hills. The valley represents the trough of the undulating ridge topography and also acts as a groundwater recharge area. It is expected that natural drainage conditions will be altered during construction phase as well as due to filling (embankments) proposed for elevating the rail line between the hills which in turn may reduce groundwater recharge and obstruct down slope water availability i.e. to the west of the rail line. Therefore, appropriate mitigation measures are required in order to overcome anticipated impacts on the local natural drainage conditions.	High
2	Geology and Geological hazard	The rock formations in the hills are comprised of basalts and alluvial deposits in the valley portion. Occasionally the basalts are intruded by dykes. Structurally the area is an active tectonic zone and several moderate to high intensity earthquakes have been reported in the area. Though, there are no major faults or shears zones reported in the area, seismic activities are indicative of weak zones and require consideration. The possibility of weak zones such as faults, joints, and shear zones could increase the potential for rock-joint rupture hazards during deep cutting and rock excavation work. Also, the geological history of the area along with the topography indicates that the hill is fit for an underground tunnel as at least 25 m overburden height is needed for a closed loop to provide the Arch section of the tunnel.	Medium
3	Hydrogeology	The intervening area between the two hill sites is a valley floor area. The low ground area through which the proposed rail alignment is to pass through is also occupied with seepage outflows of shallow groundwater that exists at the intersection of thin overlying soil mantle and the underlying basal rocks. The low-lying valley floor area between two hill sites is composed of mixed lateralised clay and eroded soil deposits washed down the hill slopes. The inhabitants of the area use this seepage outflow for their domestic use. The water is scooped through small holes of 3-4 m diameter which extends to about 3-4 m depths. The seepage is from a shallow ground water flow which enters the rail alignment from the eastern part of the watershed. Test exploratory wells may be drilled.	Medium to high
4	Ground Water Conditions	The bedrock around Belapur (19° 26' 17''.5N; 72° 51' 27''E) and Dhaniv (19° 26' 40''N; 72° 51'21''E) villages occurs at shallow depths below a soil cover of 2-5 m. The groundwater level which rests at 2-2.5 m below ground level is a perched water table and the main ground water level in the underlying basaltic rock formation occurs at a greater depth. The excavation work for the rail corridor may result in changed groundwater conditions in the area and may affect groundwater flow. This could affect drinking water sources (open wells, dug wells, hand pumps etc.) in the area.	Low to moderate depending on the results of Site based Permeability tests at identified locations
5	Ground Water Regime	The deep cutting and excavation work may affect the groundwater levels mainly during construction activities. Some of the existing open wells and borewells in and around the hill area can be identified and used for groundwater level and groundwater quality monitoring. Additional piezometers or observation wells are required to better understand the baseline groundwater levels.	Medium to high

Source: JICA Survey Team

2) Conclusions and Recommendations

The pattern of ground water flow, which is expected to be controlled by secondary rock fractures and joints in the tunneling area as well as the areas between the two hills, needs a detailed study. Three boreholes for each hill are recommended to be drilled in and around

the tunnel section. Out of the three, one borehole of 150 m depth on the designated ridge areas and the other two at the inlet and outlet tunnel portals at 100 m depth will be drilled to obtain subsurface geological and hydro-geological information. Tests such as in situ permeability testing should be conducted using these wells and data will be collected on the variability of rock units and rock permeability along the alignment.

The groundwater table in basalt aquifer is expected to occur below the tunnel depth however there are chances of seepage in the tunnel during rainy season due to rises in the groundwater levels in the study area. Where there is tunneling below the groundwater table, it would need to be drained or sealed as appropriate.

The area between the two hills for closed tunnel and open cut is the major ground water flow zone recharging from the catchment area and feeding the downstream wells. It is recommended that the corridor between the two hills should be elevated so that the existing groundwater flow would not be altered. Alteration of the same may result in the reduction of well discharge levels downstream of the tunnel section.

Ground water levels may be monitored on a monthly basis for which standpipe bores are recommended to be drilled in valley fill areas and piezometer bores on ridges and portal areas.

The water samples from monitoring boreholes should be collected and analyzed during the first year and prior to the construction phase and at least once in the post-construction phase from installed standpipes and piezometers. The standpipe in the valley fill area should be monitored for water quality for at least two years after the project completion phase and tunneling. The water quality data should be analyzed for pH and TDS levels of water in the well bores.

The above mentioned studies shall be taken up by DFCCIL through suitable experts / institutes during the detailed engineering stage, pre-construction stage, construction stage and post construction stage.

(2) Aravalli Eco-sensitive Area

1) Existing condition

In view of the physiological aspects, two sub-areas / blocks were identified for preliminary investigative study representing the central part of the corridor stretch between Bhiwadi in Alwar and Sohna in Gurgaon and the eastern section of the corridor and falling within Faridabad District bounded by Yamuna River in the east. The Aravalli area under the study consists of highly undulating topography around Sohna area and it is proposed to build the corridor by deep cutting of hill rocks.

A preliminary hydrogeological study was carried out to identify the potential issues and assess the possible impacts of the various construction activities for the proposed DFC Project on the groundwater and geological conditions in and around the deep rock cutting. The Summary Observation and Impact Matrix are shown in Table 2.15.

Table 2.15 Summary of Observation and Impact Matrix for Aravalli Eco-Sensitive Area

No	Issues	Observations	Significance of Impact
1	Topography	The DFC Project site near Aravalli area basically lies in valley fill surrounded by denudation hills on almost three sides. The valley fills represent the trough of the typical undulating ridge topography and also acts as ground water recharge area. Natural conditions may be affected due to the construction activities of the DFC Project, thereby affecting the recharge conditions in the area.	Low
2	Drainage	It has been observed that in the middle of Gurgaon stretch there is a surface water divide owing to the presence of nearly N-S trending Aravalli ridges. The streams originating from the western flank of the ridge flows westerly and joins Sahibi River and the east flowing streams finally join the Yamuna River forming the eastern boundary of the study area. The DFC intersects both perennial and non-perennial drainage systems at several places between Bhiwadi and Sohna. This has the potential to directly affect the drainage conditions of the area.	Medium
3	Slope Stability	The rock formations in the area are comprised of quartzites, mica schist and pegmatite intrusions. Structurally, the area represents an active tectonic zone. The area is bisected by a number of faults, fractures and shears, tending to run in a NNE-SSW to ENE-WSW direction. Locally the Delhi region forms the northern part of the southerly plunging fold known as Harchandpur anticline. Since the Aravalli rocky hill ridges from Banban Village to Keherani Village in Tijara Block, Alwar District and from Dhulawat Village to Rojka Village in Mewat District are made up of quartzites which are highly jointed and fractured as well as tectonically disturbed as deciphered from the geological structure map showing major as well as minor faults passing through the area. The deep cutting of rocks up to a depth of 28 m and removal of thick overburden will result in unstable conditions such as slippage of rock blocks, exposing weak joints with increased possibility of collapse of slopes during seismic events.	High
4	Geological Hazard	As deciphered from the seismic-tectonic profile of the NCR Region, it is established that the active seismic faults do not pass through the proposed DFC alignment. However, the possibility of weak zones such as faults, joints, and shear zones could enhance rock-joint rupture hazards resulting from deep cutting and rock excavation work	Medium to High
5	Soil Liquefaction	In the valley region around Aravalli Hills, the area is dominated by shallow ground water levels (< 4 m), which may result in a reduced load bearing capacity of soil.	Low to Moderate
6	Groundwater Conditions	Since groundwater levels in hard rocky areas are more than 40 to 50 m and deep cutting for DFC is restricted to 30 m, aquifer characteristics will not be affected. However, for ridge areas near Alwar which is dominated by high permeability sand dune areas, the deep excavation work for DFC Project may result in changed ground water conditions in the area and may affect the groundwater flow. This has the potential to affect drinking water sources (open wells, dug wells, hand pumps etc.) in the area due to change in the recharge conditions. The deep cutting and excavation work of DFC Project may affect groundwater levels mainly during the construction activities. Some of the existing open wells and bore wells in and around the hill area can be identified and used for groundwater levels and groundwater quality monitoring. Additional piezometers or observation wells are required for better understanding the baseline groundwater levels.	Low to moderate depending on the results of Site based Permeability tests at identified locations
7	Hydro-geology and Natural Aquatic System	The Sohna area was observed to include a number of springs and seepages in quartzite and interbedded schistose rocks; Sohna hot spring owes its origin to a deep-seated intersection of faults. The directions of linear features are conspicuous by their presence. During construction activities, the existing freshwater spring near the DFC alignment could be affected resulting in a disturbance to the natural setup, flow and discharge of the existing spring. This water spring acts as a source of drinking water as well as having thearupatic and religious values. If this natural spring is affected, this may affect water sources for some downstream villages.	Medium to High

No	Issues	Observations	Significance of Impact
8	Flora and Fauna	<p>There is no forest area in the Aravalli eco-sensitive area. In Mewat district certain vegetation patches are on panchayat land. No forest area falls within the proposed alignment.</p> <ul style="list-style-type: none"> - Impact on physical characteristics of the area due to erosion. - The impact on soil will be in terms of top soil erosion and its compaction due to location of laborers' camps storage and movement of machineries and disposal of waste on the open ground. 	No Impact

Source: JICA Survey Team

2) Conclusions and Recommendations

Based on the studies and survey carried out in the Taoru Block of Mewat District and Tijara Block of Alwar District, the following recommendations are provided to be taken up by DFCCIL during different stages of the project viz. detailed engineering, pre-construction, construction and post-construction.

a) Geotechnical and Slope Stability Study

Due to the blocky nature of the joints in quartzite rock formation of sloping ridges of Aravalli, it is recommended to conduct a study on rock slope stability particularly along the ridge facing Sohna-Rojka area as well as the narrow ridge corridor between the KMP Expressway and the extending rocky ridge between Khor-Guspethi Section. The said study should be taken up by DFCCIL through suitable experts/institutes like Central Building Research Institute (CBRI) Roorkee, CSMRS, and GSI during the detailed engineering design stage.

b) Standard Penetration Test Borings

Standard penetration test borings and laboratory grain size analysis of soil samples to identify liquefaction potential particularly over shallow groundwater table areas (areas with a groundwater table within 4 m of land surface) are to be taken up at the pre-construction stage. It is also proposed that a detailed study for assessment of liquefaction potential should also be taken up by DFCCIL during pre-construction stage.

c) Hydro-geological Investigation and Permeability Tests

Construction activity on the Aravalli ridge would involve rock excavation which may obstruct groundwater flow at various locations as the nature of fractures and joints in rock formations change. It is recommended that a detailed study be taken up for characterization and assessment of groundwater flow in the underlying aquifers to establish groundwater recharge rates and their mechanisms as well as changes if any in the post-project scenario. These should be carried out by DFCCIL using hydro-geological experts and drillers by constructing test wells during the detailed engineering or pre-construction stages.

d) Safeguard of Groundwater Dependent Ecosystems

The area adjoining Sohna has some natural springs which are connected with deep-seated fractures and tectonically linked with geological structures present at the surface and below the ground. These springs are both sources of drinking water as well as possessing therapeutic and religious values. Since the DFC alignment crosses KMP Expressway about 0.5 km north of one of the springs, utmost care will be required to avoid damage during construction, excavations and blasting so as not to disturb the natural setup and obstruct the spring flow and discharge. In view of this, it is proposed to conduct studies with an objective to work out strategies and technical measures to safeguard the discharge

of the springs. Such a study should be taken up during the detailed engineering stage by DFCCIL in and around Khor and Sohna Villages.

e) Groundwater Use in the Construction Phase

Groundwater resources in almost all the administrative units including Gurgaon, Rewari, Faridabad of Haryana and Tijara Block, Alwar District of Rajasthan falling within the study area are already overexploited. It is strongly recommended to undertake detailed studies to establish the geochemical profile of the groundwater in the study area as well as the environmental impact of any further groundwater withdrawal on the overall groundwater regime of the area. Additionally, in order to address the sustainability of the existing groundwater sources as well as partly meet the construction requirements, it is recommended that a comprehensive plan for rainwater harvesting and artificial recharge to groundwater may be formulated by DFCCIL, wherever groundwater is extracted for construction purposes.

f) Hydrological Studies

The rocky hill unit divides the precipitation falling on the hills which flows down the slope through the piedmont zones and recharge the groundwater aquifers. Any development activities taken up in the foothills or in the piedmont zone may, in turn, adversely impact the hydrodynamics of groundwater recharge. The development work associated with the project, including construction and landscaping of the area around the proposed line of the corridor, would alter the slope which will disturb the natural drainage system of the area. A detailed hydrological study may be taken up in the area at micro-watershed level to plan the diversions and the drainage system, as necessary. The details of the study may be considered at the detailed engineering or pre- construction stage.

g) Groundwater Monitoring

In view of insufficient data available on basic groundwater parameters, it is recommended that an optimum number of purpose-built ground water observation wells be constructed and a baseline dataset may be established for regular monitoring during construction stages. It would be advisable to ensure groundwater level monitoring through the construction period via specially built piezometer wells at designated sites. An optimal monitoring network would continue to monitor impacts on groundwater sources at a specified frequency by the DFCCIL throughout the preconstruction, construction and post-project periods.

h) Flora and Fauna

There is no forest area in the Aravalli eco-sensitive area. In Mewat District, certain vegetation patches are on panchayat land. No forest area falls within the proposed alignment.

Tree cutting and vegetation clearing are expected to be essential part of the construction of the corridor. Therefore, compensatory plantation in nearby areas will be initiated. Planning for the regular watering, nourishing and protection of the planted trees will ensure their effective restoration as part of the compensatory afforestation programme. In addition, an integrated management plan for mangrove areas will be developed.

2.6.4 Topography and Geographical Features

Topography and geographic features will not experience any major impact except in Bhatpada and Dhaniv forest area where tunnel construction has been proposed. On the

other hand, certain impacts resulting from high embankments are expected as a result of the Project. Since the alignment runs on a high embankment, there are local community access issues and anticipated stormwater drainage problems during the operation phase of the Project. These impacts could be minimized by providing adequate ROBs, RUBs, etc. During the construction phase, changes in topography are envisaged due to the clearing of land, felling of trees, cutting and filling, and due to construction. Filling and cutting of land will be required in the stretches where the track traverses through undulating topography. However, changes will be limited within ROW of the track. Hence, overall impacts will be localized.

2.6.5 Soil Erosion

The clearing of land, cutting of trees, excavation of borrow areas are likely to trigger soil erosion. The movement of vehicles/machinery/equipment and work forces is also likely to cause soil erosion. Borrow areas will be required for the project. Most sections of the DFC are on embankments. The borrow areas are likely to cause soil erosion and affect agricultural areas. Appropriate measures for borrow area management should be taken. Debris may also be generated due to dismantling of structures. Oil spills from the operation of the diesel pumps and diesel storage, during transportation and transfer, parking places and diesel generator sets may also have potential negative environmental impacts. The operation of the emulsion sprayer and laying of hot mix on service roads could also have negative environmental impacts. Due to changes in land use, impact is envisaged on soil during the operation phase. However, the impacts are within the ROW.

2.6.6 Groundwater

(1) Impact Analysis

Associated with the tunnel construction at the Vasai Detour, hydrological conditions in the watershed area are likely to be affected with groundwater shifting. In Vasai Detour, an underground tunnel is planned to be constructed at the hill crossing the watershed. The planned railway formation level on the Mumbai side is higher than it is at the Delhi side and as a result groundwater levels are anticipated to be affected. Due to the alteration of groundwater flow, present flow to out-flow from the tunnel after construction, the water quality of groundwater is likely to be affected especially dissolved metal contents such as iron (Fe) in the water.

(2) Mitigation Measures

The formation level in the tunnel section will be considered by DFCCIL to minimize the impact on the hydrological conditions in each watershed resulting from seepage on both sides of the tunnel. Hydrological analysis in the area covering at least 500 m from the tunnel is required and will be conducted by DFCCIL prior to the design. Correlation between rainfall and groundwater level (water discharge from the area) should be adequately analyzed based on monitoring over a longer period to clearly assess the impact. Geological structure investigation through field reconnaissance of surface condition and aerial photo analysis should be conducted prior to implementation. Water recharge to the local community should be considered to replace the groundwater used during construction. The water will be adequately treated and should be of the same or better quality as at present, based on the water quality analysis which will be conducted prior to implementation.

2.6.7 Hydrological Situation

Embankment construction between two tunnels in the valley-like condition at the undulating topographic feature in the hilly area will likely affect surface water flow and drainage in the area resulting in potential flooding upstream and water shortages downstream. Therefore, adequate drainage systems to allow surface water flow in the watershed upstream of the railway construction area should be considered based on hydrological analysis of the area.

2.6.8 Coastal Zone

(1) Impacts Assessment

The DFC will have a negative impact on the general habitat and erosion in the area. During construction phase at bridge construction sites, mangrove clearing will be carried out. Forest areas in Pade and Kasarali Villages in Thane were found to possess mangrove vegetation. In Raigad District near JNPT and in areas beyond Panvel, mangrove forests are likely to be affected.

(2) Mitigation Measures

Protection alone is insufficient to reverse the trends in mangrove forest destruction. Even when disturbance is reduced, the altered soil conditions and limited natural dispersal mean that natural recovery can be very slow. More scientific means of restoring the mangrove vegetation need to be implemented. Mangrove restoration efforts should be made to return an area to a condition more closely resembling its original state, including restoring the full range of biological diversity and all the essential ecological processes. Developing a monitoring programme to measure the success of restoration is important for effective implementation of the restoration programme.

2.6.9 Landscape

The construction of a railway embankment is likely to cause aesthetic changes to the landscape. Suitable landscaping and plantation activities, and slope protection activities are envisaged to minimize the aesthetic impacts.

2.6.10 Global Warming

The Phase 2 section is a part of the Western Corridor. Cumulative GHG emissions for 30 years (in million ton CO₂) for the Western Corridors under the DFC and No-DFC scenarios are discussed. Container and roll on-roll off (RO-RO) are the two major commodities carried by the DFC Western Corridor, accounting for about 85% of total freight GHG emissions in this Corridor. Therefore, the DFC Project plays a significant role in reducing global carbon emissions.

2.7 SOCIAL CONSIDERATION STUDY OF ESIA

Baseline Survey and Census was conducted to obtain the information of the social status of the population of the area falling in the proposed corridor. Impact and mitigation measures of land acquisition and resettlement have been separately discussed in details in the baseline survey and census report, and RRP report.

2.7.1 Land Acquisition and Resettlement

(1) Study Methodology

The land acquisition requirement has been assessed through preparation of the Land Plans. As per the land plans for 14 districts, CA has been issuing notifications for land acquisition under Railway (Amendment) Act 2008 in the Phase 2 area. Based on the 20E notification or draft 20E (including Joint Measurement List or PAP List) published/to be published under the Act, Number of Villages Affected, Number of Plots Affected and Number of Titleholders were counted.

(2) Major Finding

Based on the 20E notification or draft 20E (including Joint Measurement List or PAP List) published/to be published under the Act, the land acquisition is required in 374 villages of these 14 districts, which is approximately 2,252 ha, as summarized in Table 2.16.

Table 2.16 Scale of Land Acquisition and Resettlement (Provisional)

Name of the District	No. of Villages Affected	No of Plots Affected	No of Titleholders
I. JNPT-Vadodara Section			
Raigad	39	248	976
Thane	97	1745	13,112
Valsad	37	443	3,003
Navsari	22	416	1,468
Surat	35	655	2,773
Bharuch	29	705	2,918
Vadodara	10	315	815
II. Rewari-Dadri Section			
Rewari	17	703	5,751
Alwar	13	512	3,710
Mewat	19	891	3,050
Gurgaon	9	294	1,630
Palwal	8	706	3141
Faridabad	28	1,421	6,911
G B Nagar	11	110	361
Total (I +II)	374	9,209	49,619

Source: JICA Survey Team

(3) Impact Assessment

The agricultural area will mainly be affected due to the proposed DFC alignment. Residential areas in rural as well as in semi urban and urban areas (mainly in JNPT-Vadodara) will also be affected. There will be loss of agricultural land along the proposed corridor.

The land and property acquisition would be restricted to the bare minimum required. Appropriate compensation would be awarded through the RRP. Compensation and assistance package shall be planned in the RRP separately from the ESIA.

2.7.2 Socio-economic Features

(1) Study Methodology

Secondary data relevant to the social environment such as total population, SC population and ST population were collected and analyzed.

(2) Major Finding

The summary of the district-wise socio-economic status of the affected villages is shown in Table 2.17. The SC population varies from 1.35% for Raigad District to 23.7% for Rewari District of the total population, and the relatively higher percentage is observed in Haryana State. On the other hand, ST population ranges from 0.0% for Mewat, Palwal, Rewari, Gurgaon, Faridabad and G. B. Nagar Districts to 47.2% for Valsad District, and the relatively higher percentage is observed in Maharashtra and Gujarat States. The literacy rate ranges from 40.8% for Mewat District to 72.0% for Valsad District. The lower literacy rate is observed in Haryana and Rajasthan states. Finally, the work participation rate varies from 28.3% for G. B. Nagar District to 54.0% for Alwar District.

Table 2.17 District-wise Average of Socio-economic Features of the Affected Villages

District-wise Average	Total Population/village			SC population (%)	ST population (%)	Literacy (%)	Work Participation (%)
	Person	Male	Female				
Raigad	7,645	4,116 (53.84%)	3,529 (46.16%)	1.35	13.53	62.43	42.11
Thane	4,895	2,642 (53.98%)	2,253 (46.03%)	2.54	38.42	58.94	45.16
Valsad	6,626	3,589 (54.16%)	3,038 (46.82%)	3.60	47.21	65.69	41.46
Navsari	3,263	1,666 (51.07%)	1,596 (48.93%)	1.53	33.34	71.97	41.98
Surat	5,828	3,220 (55.24%)	2,609 (44.76%)	6.74	31.28	52.23	46.43
Bharuch	5,478	2,873 (55.45%)	2,605 (47.55%)	4.45	33.07	64.95	40.99
Vadodara	1,256	656 (52.20%)	600 (47.80%)	7.16	37.96	53.74	52.44
Alwar	1,222	644 (52.67%)	578 (47.33%)	16.22	0.40	49.71	54.02
Mewat	2,474	1,411 (57.04%)	1,063 (42.96%)	12.55	0.00	40.75	41.60
Palwal	3,421	1,865 (54.50%)	1,557 (45.50%)	21.16	0.00	49.69	33.62
Rewari	1,472	784 (53.25%)	688 (46.75%)	23.65	0.00	57.78	46.53
Gurgaon	4,611	2,452 (53.17%)	2,159 (46.83%)	19.97	0.00	49.58	43.52
Faridabad	2,985	1,607 (53.84%)	1,378 (46.16%)	22.27	0.00	48.56	39.88
G.B. Nagar	1,859	996 (53.61%)	862 (46.39%)	18.53	0.00	54.28	28.32

Note:

1. Raigad District: the data for new six villages is not available in Census of India 2001
2. Thane District: the data for new six villages is not available in Census of India 2001.
3. Valsad District: the data for Jora Vasan Village is not available in Census of India 2001.

Source: Census of India 2001

2.8 POTENTIAL IMPACTS AND MITIGATION MEASURES

2.8.1 Pollution Control

Pollution will be generated due to movement of vehicles and operation of light and heavy construction machineries during construction, and due to movement of trains and related facilities such as loading and unloading during operations. Pollution can be prevented or minimized by implementing suitable mitigation measures at appropriate stages of the project cycle. The mitigation measures are summarized in Table 2.18.

Table 2.18 Environmental Impacts and Mitigation Measures (Pollution Control)

No.	Potential Impacts	Mitigation Measures
1	Noise and Vibration	
<i>Construction Phase</i>		
	<ul style="list-style-type: none"> - Due to movement of vehicles, and operation of light and heavy construction equipment and machineries. - Higher noise and vibration level has some possibility to cause sleep disturbance and mental instabilities to the residents living adjacent to the proposed corridor. 	<ul style="list-style-type: none"> - Notify the local people in case of blasting operations or similar construction activities associated with higher noise and vibration level. - Locate the quarry sites away from the residential areas and sensitive receptors. - Regularly maintain machinery and vehicles, with particular attention to silencers and mufflers, to keep construction noise levels to minimum. - Locate construction yards away from the settlement and sensitive areas. In unavoidable cases, the time of the construction activities shall be limited. - Provide protection devices (ear plugs or ear muffs) to the workers operating in the vicinity of high noise generating machines.
<i>Operation Phase</i>		
	<ul style="list-style-type: none"> - Noise and vibration levels are likely to increase due to movement of high speed freight trains with double-decker carriages and related facilities such as loading and unloading. 	<ul style="list-style-type: none"> - Suitably provide vegetative barrier in the buffer zone. - Erect noise barriers at appropriate locations such as residential areas and sensitive receptors. - Expand the right of way (buffer zone) as far as practicable as an effective method of reducing the noise and vibration impact. - Ensure and keep correct track geometry by advanced measurement, use of long-welded rails and incorporation of new technologies for structures and rolling stocks to reduce noise and vibration levels.
2	Water pollution	
<i>Construction Phase</i>		
	<ul style="list-style-type: none"> - Wastewater from construction activities with suspended impurities. - Untreated wastewater disposal from the office camp or labor camp as well as sludge generated from the construction activities. - Increase of sediment load in the runoff from site roads and other exposed soil in the construction area would increase turbidity in receiving streams/water bodies. - Spillage and uncontrolled release of construction and toxic materials could also impact surface and ground water. - Slight change in hydrology and geomorphology of the stretch of water course directly affected by the temporary works at the site of new crossing. 	<ul style="list-style-type: none"> - Comply with all relevant water quality laws during the entire period of construction activity. - Ensure that no liquid is discharged from any construction site/activity without treatment. - Retain site drainage in purpose-built lagoons for enough time to allow most sediment to settle out before discharge to natural or urban drains or provide sediment traps in drainage system. - Cover stockpiled soil and other loose material with secure tarpaulins and drainage should pass from stockpile areas into settlement lagoons. - Collect and store used or waste oil in sealed damage-proof containers and may be sold to Central Pollution Control Board (PCB)/State PCB-approved authorized recycler/ re-processor. - Provide proper sanitation facilities at the construction site to prevent health-related problems due to water contamination.

No.	Potential Impacts	Mitigation Measures
3	Air pollution	
<i>Construction Phase</i>		
	<ul style="list-style-type: none"> - Deterioration of ambient air quality due to particulate matter such as dust, especially during dry conditions and gaseous emissions from construction equipment and vehicular traffic. - Some locations along the alignment route are notified as critically polluted areas. 	<ul style="list-style-type: none"> - Consult the local pollution authorities, comply with relevant air quality laws and obtain necessary permissions at least for critically polluted areas before start of any construction related activities. - Maintain all construction vehicles to minimize vehicle emissions. - Payload area of the trucks or dumpers should be covered by tarpaulin when transporting soil and crush. Also, construction materials should be stored in covered go-downs or enclosed spaces. - Use adequate dust suppression measures such as regular water spraying on unpaved haul roads, vulnerable areas of the construction sites, during unloading from the truck/dumper, at the primary crusher feeder chute, the transfer points from one belt conveyor to another, etc. - All major construction machineries should have built-in appropriate dust reduction measures.
4	Waste Generation	
<i>Construction Phase</i>		
	<ul style="list-style-type: none"> - Significant quantities of solid waste during construction such as gravel, concrete, soil, steel, miscellaneous structures such as culverts, poles and cables, organic material such as cleared vegetation, timber, and waste food from labor camps. - In addition, some quantity of hazardous waste shall be generated such as waste oil, fuel, grease and chemicals from construction equipment and vehicle servicing. 	<ul style="list-style-type: none"> - Comply with relevant laws pertaining to the management and disposal of solid waste and hazardous waste. - Before start of construction activities, all suitable disposal measures should be identified for solid waste and any other form of waste likely to be generated from the construction activities. - A designated solid waste disposal site should be secured away from human settlements. In addition, a disposal site should be located away from water streams and any archaeological and historical monuments. - No dumping should be carried out on private property without written consent of the owner. - No dumping should be allowed on wetlands, forest areas, and other ecologically sensitive areas. - All areas designated for the storage of fuels, oils, chemicals or other hazardous liquids should have a dense base and surrounded by a bund to contain any spillage. These areas should be covered by a roof structure to minimize the potential for infiltration and contamination of rainwater. - Hazardous waste management plan should be prepared and implemented for disposal of waste oil, batteries and other hazardous materials.
5	Disaster	
<i>Construction Phase</i>		
	<ul style="list-style-type: none"> - Rewari-Dadri section is in the Seismic Zone IV as per seismic zoning map of India which makes the area susceptible to moderate to high intensity earthquakes and is considered as High Risk Zone. - Since the Aravalli rocky hill ridge falls in Seismic Zone IV, deep rock cutting up to the depth of 28 m and removal of thick overburden could result in unstable conditions such as slippage of rock blocks, exposing weak joints with increased possibility of collapse of slopes during seismic disaster. - Embankment structure along the major part of the DFC Corridor could trap rain water and cause flooding around the project area. - Although Vasai detour is in Seismic Zone III (low intensity), the seismic activities at moderate level could enhance the rock-joint rupture hazard during rock cutting and excavation during construction of tunnel work. 	<ul style="list-style-type: none"> - Appropriately incorporate seismic factors in the civil and structural designs of major structures in DFC Project. - An engineering geologist should identify any slope instability potential among the uniform rock structure especially along the Aravalli ridge where deep rock cutting will be done during detailed engineering stage. - Provide adequate cross-drainage channels along the DFC route at suitable locations for the smooth passage of the surface run-off to prevent flooding. - Although the geological history of the Vasai detour area along with the topography indicates that the hill block is fit for underground tunneling as the minimum 25 m overburden height is available for closed loop to provide arch section of the tunnel, any unstable or rock-joint rupture hazard should be identified by an engineering geologist.

Source: JICA Survey Team

2.8.2 Natural Environment

The natural environment is contrasted with the built environment which is strongly influenced by human activity. Environmental degradation can be prevented or minimized by implementing suitable mitigation measures at appropriate stages of the project cycle. The present section envisages the likely impacts of the proposed freight corridor on the natural environment and suggests a range of mitigation measures. Mitigation measures are summarized in Table 2.19.

Table 2.19 Environmental Impacts and Mitigation Measures (Natural Environment)

No.	Potential Impacts	Mitigation Measures
1	Flora	
<i>Pre-Construction Phase</i>		
	<ul style="list-style-type: none"> - Alignment passes through about 20 forest patches of Recorded Forest Area in Thane District with area of nearly 32 ha and one forest patch in Gautam Buddh Nagar District with an affected land area of nearly 10 ha causing loss of trees and habitat. 	<ul style="list-style-type: none"> - Assess alternatives and review design to reduce loss of forest land to the minimum. - Follow the procedure for obtaining clearance under the Forest Conservation Act (FCA), 1980 after due consultation with the Forest Department (FD). - Pay legally required compensation to FD to cover cost of compensatory afforestation program. - Comply with all stipulated conditions of Forest Clearance when granted.
<i>Construction Phase</i>		
	<ul style="list-style-type: none"> - Loss of flora due to felling of trees, herbs and shrubs within ROW linearly along the alignment route in both the forest and non-forest areas would adversely affect landscape locally, habitat fragmentation and loss, and may impact the conservation and preservation planning and status of the local State Forest Department. - Loss of private orchard farms in Dahanu area of Thane District will affect landscape, local conservation and soil erosion prevention status in this notified eco-sensitive area as well as economic loss to local people. - Increased earth and rock extractions may affect or remove root structures and disrupt ecosystems. - Construction workers' use of local timber for small scale temporary housing or furniture and in particular for firewood and other small uses may have negative impacts - Deposition of fugitive dust on pubescent leaves of nearby vegetation could lead to temporary reduction of photosynthesis. 	<ul style="list-style-type: none"> - Joint field verification with the respective State FD to avoid uncontrolled and indiscriminate tree felling. - Appropriate compensatory plantation using native species or pollution tolerant species with rate of replacement as per the State FD. For example, for Dahanu eco-sensitive area, ten trees for each tree cut. - Compensation for private land should be based on fruit yield, timber and other economic values. - The need for wood as building materials for workers' temporary housing should be replaced with alternative eco-friendly building materials but if unavoidable, should only be bought from the sustainable source or authorized selling depots in the project area. - Regular and proper water sprinkling near the site to minimize dust deposition on vegetation.
<i>Operation Phase:</i>		
	<ul style="list-style-type: none"> - Improper post-plantation care/maintenance as well as illegal cutting of plantation along DFC track will offset all positive efforts by the project. 	<ul style="list-style-type: none"> - Plantation along the ROW should be maintained properly as well as protected from illegal cutting.
2	Fauna	
<i>Pre-Construction Phase</i>		
	<ul style="list-style-type: none"> - Fauna inhabiting the Recorded Forest Areas of Thane District and Gautum Buddh Nagar District may be affected by the construction/operation. 	<ul style="list-style-type: none"> - Review design and make adjustments to ROW or alignment route to the extent feasible to reduce loss of Recorded Forest Lands to the minimum as well as to keep safe distance from the protected boundary of the notified forest areas.

No.	Potential Impacts	Mitigation Measures
<i>Construction Phase</i>		
	<ul style="list-style-type: none"> - Both terrestrial and avifauna may be affected by noise and vibration due to construction equipment and machinery as well as movement of construction bound vehicles. - Fauna may be impacted by destruction of habitats such as bird nests, breeding sites etc. along the new alignment route. - Construction workers having greater accessibility to the forest could lead to poaching activity in the forest areas along the corridor. - Increased sediment loads into major water bodies during bridge construction work may impact aquatic fauna due to temporary loss of habitat and reduced water quality. 	<ul style="list-style-type: none"> - All major noise producing construction equipment/machineries should be fitted with acoustic control measures so as not to impact local fauna. - No construction yard should be set up in the forest areas. - Honking should be strictly prohibited in the forest area by the trucks and dumper used for the construction activity. - Construction schedule should be in such a manner to avoid heavy construction near forest areas during the winter season when migratory birds inhabit the area. - Minimize turbidity in the river water by activities such as major earth work for important bridges only during the dry period, care during construction of bridge piers for coffer dams.
<i>Operation Phase:</i>		
	<ul style="list-style-type: none"> - Division of habitats due to DFC line can affect faunal population range and distribution, ability to mate, connectivity between populations. - Impact on aquatic fauna in case of accidental oil spill and toxic chemicals release finding their way into the water bodies. 	<ul style="list-style-type: none"> - Take immediate actions for speedy cleaning up of oil spills, fuel and toxic chemicals in the event of accidents. - Provide crossing structures where the DFC line passes through the forest patches after discussing with the local FD or local NGO to determine the location, frequency, basic design and number of crossing structures.
3	Protected Areas	
<i>Pre-Construction Phase</i>		
	<ul style="list-style-type: none"> - Alignment passes through reserved forest area between SGNP and Tungareshwar Wildlife Sanctuary along parallel section, so wildlife may be disturbed by the construction/operation. - In Thane District, new DFC route will impact some mangrove areas which are notified as reserved forests. 	<ul style="list-style-type: none"> - Review design and make adjustments to ROW or alignment route or loop length of junction yards to the extent feasible to reduce loss of reserved forest land near protected area to the minimum. - Consult the State's Chief Wildlife Warden and other key officials and follow the procedure for obtaining clearance under the Wildlife Protection Act, 1972 for the protected area. - Consult State FD and submit timely application for Forest Clearance (FC) under the Forest Conservation Act (FCA) for mangrove areas. - Comply with all stipulated conditions.
<i>Construction Phase</i>		
	<ul style="list-style-type: none"> - Mangrove areas with dominant species having conservation concern in the State of Maharashtra will be affected by construction activities. - Felling of some endangered flora species in the ROW near SGNP, thereby adversely affecting conservation status and may lead to habitat fragmentation and loss. - Fauna may be impacted by destruction of water holes and habitats such as bird nest and breeding sites along the new alignment route near protected area. 	<ul style="list-style-type: none"> - Compensate loss of mangrove vegetation by replanting at other mangrove sites after due consultation with the FD and pay legally required compensation fees. - Compensatory plantation for endangered species in degraded forest land near SGNP as per the guidelines of the State FD. - Develop lost water holes at strategic sites inside the forest areas to encourage wildlife movement inside the forest after due consultation with the SGNP Authority. - No earthen material or water from the springs present in the protected area should be used for the construction activity.
<i>Operation Phase</i>		
	<ul style="list-style-type: none"> - Potential direct impact of DFC trains hitting wildlife near protected area since DFC trains will be faster, more frequent and produce less noise. 	<ul style="list-style-type: none"> - Incorporate some appropriate structures into the design such as underpasses, pipe culverts and/or other crossing structures as needed to allow wildlife to cross line safely.

No.	Potential Impacts	Mitigation Measures
4	Hydrological Conditions	
<i>Construction Phase</i>		
	<ul style="list-style-type: none"> - Natural drainage and recharge conditions near project sites could be affected due to blockage of drainage channels, deep rock cutting, tunnel activities, earth filling, land leveling and other construction activities. - The DFC line intersects both perennial and non-perennial drainage system at several places which has the potential to directly affect the drainage conditions of the area. - Increased incidence and duration of floods due to obstruction of natural drainage courses by the embankment. 	<ul style="list-style-type: none"> - Consideration of provision of DFC track through via duct (elevated) instead of filled-in (embankment) in valley regions so that the existing surface and ground water flow are not altered. - No dumping of material into natural drains so as not to block or impede or alter drainage channels. - Adequate cross-drainage channels (longitudinal and median drains) should be provided along DFC route at suitable locations for the smooth passage of the surface run-off to prevent flooding. - Capacity of existing drainage works, cross-drainage structures in the parallel section should be duly augmented, wherever necessary or river channel should be realigned such as between Navsari and Sachin stretch, to accommodate high discharges to avoid flooding of DFC line and formation of water pool. - Suitable drainage at construction site and camp should be provided to avoid formation of stagnant pool of water that lead to soil erosion, water logging and breeding of mosquitoes.
<i>Operation Phase:</i>		
	<ul style="list-style-type: none"> - Local drainage is likely to be affected due to formation of embankment along DFC alignment. 	<ul style="list-style-type: none"> - Provision of longitudinal drains of sufficient capacity on both sides of the DFC track to accommodate increased run-off with an outfall in the nearby drainage carrying system.
5	Topography and Geology	
<i>Construction Phase</i>		
	<ul style="list-style-type: none"> - Impact on overall relief of the region due to DFC alignment passing through plain, rolling and hilly terrain. - Enhancement of rock-joint rupture hazard due to deep cutting and rock excavation work in hilly blocks along alignment. - Disfiguring of topography and disturbance to geological setting due to indiscriminate digging of borrow pits. 	<ul style="list-style-type: none"> - Involvement of specialized engineering geologist to study rock-rupture hazards and bed rock geology along with characterization of weak zones in critical hill blocks such as Aravalli hills, Vasai detour. - Use of only identified borrow pits and quarry sites to avoid any disfiguring of topography. - Procurement of construction materials from the existing approved and licensed quarry sites only.
6	Soil Erosion	
<i>Construction Phase</i>		
	<ul style="list-style-type: none"> - Loose soil for embankment preparation could result in silt run-off. - Loss of productive soil may result from uncontrolled opening up of borrow pits. - Loosening of top soil and loss of vegetative cover within ROW along the detour and parallel section due to excavation, land cut and back filling could increase soil erosion. 	<ul style="list-style-type: none"> - Avoid cut and fill operation in the monsoon season. - Protect embankment slopes and exposed hill surfaces from low cost bio-engineering products. - Reuse top soil from the construction sites for construction of embankment to enhance growth of vegetation on the embankment surface and its consolidation. - Top soils of the borrow pit sites should be conserved and restored after excavation is over. - Use of fly ash and its products as a substitute to top soil

No.	Potential Impacts	Mitigation Measures
7	Groundwater	
<i>Construction Phase</i>		
	<ul style="list-style-type: none"> - Major part of project area especially in Rewari-Dadri and Gujarat section is vulnerable to ground water both in terms of quality and quantity due to overexploitation as far as dynamic ground water resources are concerned. - Uncontrolled use of groundwater for concrete making, embankment compaction, dust suppression and other requirements during construction would put further stress on ground water resource in these areas. - The excavation work for construction of tunnel in Vasai Detour could affect ground water conditions. 	<ul style="list-style-type: none"> - Use of only identified groundwater sources by the Central Ground Water Authority based on estimated quantity and expected quality for construction use. - Prepare a comprehensive plan to conserve water using best practices along with artificial recharging mechanism.
8	Landscape	
<i>Construction/ Operation Phase</i>		
	<ul style="list-style-type: none"> - As long as the project implement appropriate mitigation measures to stabilize slopes, prevent accelerated soil erosion, grow vegetation on the cut faces and borrow pits, and minimize impacts on existing vegetation, the project would cause no significant impacts on environmental aesthetics part of landscape. 	<ul style="list-style-type: none"> - The quarry sites should be at least 500 m away from human settlements. - In case quarry sites are close to the freight corridor, trees and other vegetation should be left between the quarry/crushing plant sites and the freight corridor. The vegetation acts as good filters of dust as well as improving environmental aesthetics.
9	Water Use	
<i>Construction Phase</i>		
	<ul style="list-style-type: none"> - Impact on water use only during the construction phase and at yards and stations. Possible impacts will be on quality and quantity of surface and ground water. 	<ul style="list-style-type: none"> - Use river water only after obtaining necessary permits from the respective State Government authorities. - In case there is no possibility of getting surface water during construction, tap groundwater after obtaining necessary permission from the authorities concerned such as the Central Groundwater Board. - The water courses should not be blocked while constructing the corridor, but suitable culverts and drains should be provided for the free flow of water. - Reduce wastage of the existing water resource to avoid possible impacts on the local population's water supply.

Source: JICA Survey Team

2.8.3 Social Environment

The Project has conducted detailed assessment of social aspects of the proposed DFC Project. All the villages along the freight corridor were considered for the study by collecting the required information from the affected population including displaced population using a structured questionnaire and other population who would be impacted in other ways too. Mitigation measures are summarized in Table 2.20.

Table 2.20 Environmental Impacts and Mitigation Measures (Social Environment)

Impacts	Status	Mitigation Measure
Local Economy	Local economy such as employment and livelihood will be affected due to land acquisition and involuntary resettlement.	<ul style="list-style-type: none"> - Negative impacts on the local economy could be mitigated through the creation of new employment or livelihood opportunities related to the railway e.g. jobs for priority PAPs as station staff, or maintenance staff, construction workers. - Give priority to employment of local people as skilled or unskilled workers based on their availability in the vicinity of construction sites. - As much as possible, employ people affected by land acquisition and from disadvantaged households so as to provide temporary source of income.

Impacts	Status	Mitigation Measure
Land Use and Utilization of local resources	Land use and utilization may be affected.	- Restoration of agriculture land and orchards. Irrigation sources should be replaced.
Social Institutions (including regional severance)	Affected communities would be disturbed in terms of regional severance by construction work and new freight tracks and other related facilities.	- Access to and connection with the community shall be secured by providing the alternative passage.
Socially vulnerable groups such as poor, indigenous and ethnic people	Socially vulnerable groups such as poor, indigenous and ethnic people may be affected.	- Equitable opportunities for ethnic and vulnerable groups to participate in consultation processes and receive compensation or benefits. This may require printing of materials in different languages or use of interpreters.
Inequitable or unfair distribution of benefits and damages	PAPs may feel that industrial and commercial sectors will benefit.	- Proper compensation and livelihood assistance shall be provided as per the compensation policy to be established in the RRP.
Historical and cultural heritage	Religious structures affected.	- It should be handled with a sensitive approach and carefully resolved between project managers and village leaders/local authorities. - If construction work is carried out in the limits of prohibited area (within 100 meters) or regulated area (100-200 meters) of any designated heritage or archaeological sites and remains, permission should be obtained from the relevant authorities. The status of such structures should be checked with the archaeological department. - No building or structure of historical importance which has been in existence for more than 75 years should be demolished without informing the relevant authorities. - Do prescribed procedures for taking permission from the local authority or community before excavation of any burial ground, graveyard or Idgah.
Local conflict of interests	PAPs feel that their interests are not being adequately taken care of by the state government/DFCCIL.	- Efforts made to incorporate local/PAP interests into design, construction and operation phases. Requires careful facilitation and again effective participation may require translation/interpretation for fair representation. Also make clear compensatory benefits and what PAPs are entitled to and how to get it.
Sanitation	An issue with the advent of construction workers.	- Proper sanitation facilities should be installed.
Hazardous (risk) infectious diseases such as HIV/AIDS	Could arise with influx of construction workers.	- Mass awareness campaigns and distribution of condoms should be planned.
Accident	During construction phase large vehicles and equipment may cause accidents.	- Handling and implementation should be taken care to avoid accidents. During major excavations, locals must be informed. - Provide proper warning signals, alarm system to warn people of oncoming trains. - Provide safety walls in accident prone areas. - Do initial awareness campaigns on safety instructions and precautions in nearest villages and communities along the alignment route. - Incorporate safety measures into the design to discourage people from gaining access to the DFC line.

Impacts	Status	Mitigation Measure
Occupational Safety	During construction phase, large vehicles and equipment may affect safety.	<ul style="list-style-type: none"> - Safety rules should be followed. - Strictly comply with relevant labour laws pertaining to the health and safety of workers, employees and others. - Provide all workers and staff with Personal Protective Equipment (PPE) appropriate to their job on-site. - Secure all construction sites with tamper-proof fence, with security lighting and regular security patrols. - Store and stack all materials and components safely in dedicated secure areas. - Do not use any paint containing lead or its products or material containing asbestos. - Smoking should be prohibited near areas of fire or explosion risk. - Ensure sufficient supply of potable water to all workers and employees on-site. - Ensure that first aid kits are available in all work areas, supplied with adequate material to treat common workplace injuries. - Provide dedicated transport at all work sites to take injured persons to hospitals if needed. - Keep record of all nearest hospitals and health centers at each construction sites. - Provide a regular medical facility at each laborers' camp with suitable qualified staff and equipment to treat minor ailments and injuries. - Establish an effective alarm system to warn track workers of approach of trains on IR lines. - Protect all electric sub-stations, high tension towers and other areas from electrocution risk by providing security fencing and lights, warning signs and security patrols.

Source: JICA Survey Team

2.8.4 Other Environmental Issues

There are several other aspects which could result in significant impacts on environment in different phases of the project. These are listed in Table 2.21 along with the mitigation measures.

Table 2.21 Environmental Impacts and Mitigation Measures (Other Environment)

No.	Potential Impacts	Mitigation Measures
1	Location of Laborers' Accommodation Camps	
<i>Pre-Construction Phase</i>		
	- Accommodation camps for workers can damage trees, habitats and landscape when built and affect water and air quality and cause social problems when in use.	<ul style="list-style-type: none"> - Carefully select camp locations to minimize loss of trees/habitats. - Locate camps away from inhabited areas and rivers or streams. - Design camps as per the local laws and guidelines.
2	Temporary Use of Land	
<i>Pre-Construction Phase</i>		
	- As land will be acquired temporarily for laborers' camps, stockpiles, borrow pits etc., it will be affected and polluted by works.	<ul style="list-style-type: none"> - Lease of land should be negotiated / agreed with owners. - Inform proposed use of land to the owners. - Reinstate land to owner's satisfaction after use.
3	Borrow Pits and Quarries	
<i>Construction Phase</i>		
	- Indiscriminate excavation for construction materials could adversely affect landscape, topography and drainage and increase vector borne diseases by encouraging mosquito breeding.	<ul style="list-style-type: none"> - Obtain all construction materials from existing licensed quarries as far as practicable. - If any new borrow areas are needed, adhere to necessary approval process, either internal or external, before any excavation.

No.	Potential Impacts	Mitigation Measures
		- Rehabilitate all borrow areas and quarries which are affected by the DFC Project activities after use in coordination with the local government departments.
4	Accommodation Camp Management	
<i>Construction Phase</i>		
	- Poor quality accommodation could affect workers physically, physiologically and psychologically, damage the natural environment and cause social problems at the camp and in host communities.	<ul style="list-style-type: none"> - Provide proper accommodation to all employees who are working a significant distance from their home. - Locate water storage tanks above ground and boreholes away from toilets/drains. - Provide clean and properly staffed and equipped canteen at all camps. - Provide separate accommodation and bathrooms for men and women. - Wastewater from the camps should be suitably treated and disposed away from the sites as per the applicable standards and guidelines. - Do regular spray of a mixture made from diesel and insecticides at all water stagnation areas to avoid mosquito breeding and spread of any vector borne diseases. - Provide garbage bins at suitable locations and ensure that each site is tidied and refuse taken to a licensed site regularly.
5	Contractor's Demobilization	
<i>Construction Phase</i>		
	- The long term impacts of construction can be magnified unnecessarily if contractor demobilize without reinstating land they have occupied temporarily and clearing away debris and other waste.	<ul style="list-style-type: none"> - Remove all garbage, debris and hazardous materials from construction sites and depose at licensed disposal sites. - Consult with owner of the site and leave any building, well or any structure if wanted by them. - Fill all trenches and remove all equipment, plant and materials from the site. - Compensate for reinstating the landscape and vegetation disturbed during construction activity.
6	Severance	
<i>Operation Phase</i>		
	- Where the DFC alignment is along detour route away from an existing IR, the operation of new line could disrupt people's activities if sufficient road and rail crossings are not provided.	- Where the DFC line crosses existing roads and major footpaths, appropriate structures should be provided such as rail flyovers, RUB, ROB, level crossings, pedestrian subways etc. with proper height and width to enable the crossings to continue.

Source: JICA Survey Team

2.9 ENVIRONMENTAL MANAGEMENT AND MONITORING PLANS

2.9.1 Environmental Management Plan (EMP)

(1) Basic Approach of Environmental Management Plan (EMP)

The EMP is designed based on the impact assessment which covers all aspects of the natural and social environment so that adverse impacts, if any, are taken care of and the project does not create any hazard or affect the quality of life for present and future generations. The EMP should always have a long term perspective and make futuristic predictions considering the developmental activities likely to take place.

The basic approach for the EMP includes technical, social, economic, cultural, public health and institutional components. The main components are described briefly in the following points:

- Green belt development,
- Queries / borrow areas management and rehabilitation,
- Noise and vibration management and control,
- Appropriate water management including hazardous materials,
- Soil erosion control,
- Management for land acquisition, resettlement and rehabilitation,
- Occupational health safety management,
- Good construction practices.

(2) Stage -wise Activities of Environmental Management Plan

1) Environmental Management Plan (EMP)

The project will be executed in a stage-wise manner. i.e., pre-construction (Planning/Design stages), construction and operation phases, the detailed design stage will be concentrated on the alignment and ground truthing of the entire project area. Acquisition of land is essential for the construction stage. The location for the borrow pits and quarry areas will be identified for the construction works. The environmental issues during construction stage generally involve equity, safety and public health issues. The DFC will bisect numerous protected areas and mangrove forests, therefore impacts on the natural environment and fragile ecosystems are one of the key issues. The contractor is required to comply with the laws with respect to environment protection, pollution prevention, forest conservation, resettlement and safety and any other applicable law. The EMP provides guidance and stipulations on how project activities are to be controlled, implemented and monitored in order to minimize environmental impact. Tables 2.22, 2.23 and 2.24 summarize the main mitigation and management measures for significant impacts in planning/design, construction and operation phases, respectively. They also identify the parties to incur the costs and implement the measures. Basically, DFCCIL has all responsibility of the EMP as a project implementation agency of the DFC Project Phase 2. In case the control/supervisor position is clear, the detail organizations are proposed. Under section of DFCCIL and counterparty organization are proposed as organization of planning and implementation.

Table 2.22 Environmental Management and Responsibilities during the Planning/Design Phase

No.	Identified Negative Impact	Mitigation/Management Measures	Organization		Other Concerned Entities	Estimated Costs of Measures
			Planning and Implementation	Supervision and Responsible		
1	Land Acquisition and Resettlement	<ul style="list-style-type: none"> - The acquisition of land and private properties shall be carried out in accordance with the RRP and entitlement framework for the project approved by DFCCIL. - Social Environmental Management Unit (SEMU) has to ascertain that any additional environmental impacts resulting from acquisition of land shall be addressed and integrated into the EMP and other relevant documents. - Proper compensation and livelihood assistance shall be provided as per the compensation policy to be established in the RRP. - Restoration of agriculture land and orchards. Irrigation sources should be replaced. 	Parties should be determined in a separate RRP Study.	DFCCIL	-	To be determined in a separate RRP Study.
2	Tree Cutting and Green Belt Development	<ul style="list-style-type: none"> - Assess alternatives and review design to reduce loss of forest land to the minimum. - Review design and make adjustments to ROW or alignment route or loop length of junction yards to the extent feasible to reduce loss of reserved forest land near protected area to the minimum. - Consult the State's Chief Wildlife Warden and other key officials and follow the procedure for obtaining clearance under the Wildlife Protection Act, 1972 for the protected area. - Consult State FD and submit timely application for Forest Clearance (FC) under the Forest Conservation Act (FCA) for mangrove areas. - Comply with all stipulated conditions. - Pay legally required compensation to FD to cover cost of compensatory afforestation program. - Comply with all stipulated conditions of Forest Clearance when granted. - Special care will be taken at the eco-sensitive areas like Dahanu area, Gulistanpur and Aravalli region. - Review design and make adjustments to ROW or alignment route to the extent feasible to reduce loss of Recorded Forest Lands to the minimum as well as to keep safe distance from the protected boundary of the notified forest areas. - Green belt development at the container terminals and at the sensitive locations such as the residential areas. 	Design Consultant and Contractor	DFCCIL	Respective State Forestry Department	Estimated at the detailed design stage based on detailed land use
3	Crushers, and Concrete Batching Plants /Construction work	<ul style="list-style-type: none"> - All construction plants will be sited sufficiently far away from settlements and agricultural operations and commercial establishments. - Plants will be located at least 100 m away from the nearest dwelling preferably in the downwind direction. - Arrangements to control dust pollution including silica dust through provision of wind screens, water sprinklers, and dust extraction systems will be provided at all such sites. - Specifications for crushers, and concrete batching plants will comply with the requirements of the relevant emission control legislation. - Consent for the establishment and operation from statutory authorities shall be obtained before establishment and operation respectively. - If construction work is carried out in the limits of prohibited area (within 100 meters) or regulated area (100-200 meters) of any designated heritage or archaeological sites and remains, permission should be obtained from the relevant authorities. The status of such structures should be checked with the archaeological department. 	Design Consultant and Contractor	Engineer and Supervisor Consultant	Respective, SPCB, State Ground Water Authority, and State Department of Mines	No incremental cost. However, statutory consent fees will be applicable which varies from State to State

No.	Identified Negative Impact	Mitigation/Management Measures	Organization		Other Concerned Entities	Estimated Costs of Measures
			Planning and Implementation	Supervision and Responsible		
		<ul style="list-style-type: none"> - No building or structure of historical importance which has been in existence for more than 75 years should be demolished without informing the relevant authorities. - Do prescribed procedures for taking permission from the local authority or community before excavation of any burial ground, graveyard or Idgah. 				
4	Construction Vehicles, Equipment and Machinery	<ul style="list-style-type: none"> - All vehicles, equipment and machinery to be procured for construction will conform to the relevant Bureau of India Standard (BIS) norms. - The discharge standards promulgated under the Environment Protection Act, 1986 and Motor Vehicles Act, 1988 shall be strictly adhered to. - The most silent/quiet equipment available in the market shall be used for the Project. Planning should avoid route alignment to avoid residential areas. - All major construction machineries should have built-in appropriate dust reduction measures. 	Design Consultant and Contractor	DFCCIL	State Transport Department and SPCB	No incremental cost
5	Construction Water	<ul style="list-style-type: none"> - Comply with all relevant water quality laws during the entire period of construction activity. - Ground /surface water as a source of water for construction requires necessary permissions which will be obtained from the respective State Irrigation Departments and State Ground Water Boards. - Retain site drainage in purpose-built lagoons for enough time to allow most sediment to settle out before discharge to natural or urban drains or provide sediment traps in drainage system. 	Design Consultant and Contractor	Engineer and Supervisor Consultant	-	Statutory consent fees will be applicable which varies from State to State
6	Quarry Area and Sand Sites	<ul style="list-style-type: none"> - Procurement of construction materials for quarries will be finalized after assessment of the availability of sufficient materials, quality and other logistic arrangements. - Final locations and the necessary clearances should be obtained from the statutory agencies like the State Pollution Control Boards and from the Mining Department. - Planning of haul roads for accessing quarry areas will be undertaken during this stage. - The haul roads shall be routed to avoid agricultural areas as much as possible and will use existing village roads wherever available. - The sand will be procured from identified sand mines as much as possible. - Permission to be obtained from the statutory departments of the state. 	Design Consultant and Contractor	Engineer and Supervisor Consultant	-	No incremental cost
7	Borrow Areas	<ul style="list-style-type: none"> - The earth material is to be borrowed from select borrow areas, until a formal agreement is signed between landowner and the executing agency. - Final locations and the necessary clearances should be obtained from the statutory agencies like the State Pollution Control Boards and from the Mining Department. - Planning of haul roads for accessing borrow areas will be undertaken during this stage. - The haul roads shall be routed to avoid agricultural areas as much as possible and will use the existing village roads wherever available. - Lease of land should be negotiated / agreed with owners. - Inform proposed use of land to the owners. - Reinstate land to owner's satisfaction after use. 	Design Consultant and Contractor	Engineer and Supervisor Consultant	-	No incremental cost

No.	Identified Negative Impact	Mitigation/Management Measures	Organization		Other Concerned Entities	Estimated Costs of Measures
			Planning and Implementation	Supervision and Responsible		
8	Labour	<ul style="list-style-type: none"> - Preferably use unskilled labour drawn from local communities to maximize benefits to the local community. - Negative impacts on the local economy could be mitigated through the creation of new employment or livelihood opportunities related to the railway e.g. jobs for priority PAPs as station staff, or maintenance staff, construction workers. - Give priority to employment of local people as skilled or unskilled workers based on their availability in the vicinity of construction sites. - As much as possible, employ people affected by land acquisition and from disadvantaged households so as to provide temporary source of income. 	Contractor	DFCCIL	-	No incremental cost
9	Construction Camp	<ul style="list-style-type: none"> - Setting of the construction camps will not be proposed within 500 m from the nearest settlements to avoid conflicts and stress over the infrastructure facilities with the local community. - Location for stockyards of construction materials will be identified at least 300 m away from watercourses. - The sewage and solid waste disposal system for the camp will be designed, built and operated. - Design camps as per the local laws and guidelines. 	Contractor	DFCCIL	-	No incremental cost
10	Disaster	<ul style="list-style-type: none"> - The seismic factors should be appropriately incorporated in the civil and structural designs of major structures in DFC Project. - An engineering geologist should identify any slope instability potential among the uniform rock structure along the Aravalli ridge where deep rock cutting will be done. DFCCIL should take up such study through suitable experts/institutes during detailed engineering stage. - Adequate cross-drainage channels (longitudinal and median drains) should be provided along DFC route at suitable locations for the smooth passage of the surface run-off to prevent flooding. - Any unstable or rock-joint rupture hazard should be identified by an engineering geologist. - Involvement of specialized engineering geologist to study rock-rupture hazards and bed rock geology along with characterization of weak zones in critical hill blocks such as Aravalli hills, Vasai detour. 	Design Consultant and Contractor	DFCCIL	-	Rs 500,000 for engineering geologist
11	Social institution	<ul style="list-style-type: none"> - Access to and connection with the community shall be secured by providing the alternative passage. - Provide crossing structures where the DFC line passes through the forest patches after discussing with the local FD or local NGO to determine the location, frequency, basic design and number of crossing structures. - Where the DFC line crosses existing roads and major footpaths, appropriate structures should be provided such as rail flyovers, RUB, ROB, level crossings, pedestrian subways etc. with proper height and width to enable the crossings to continue. 	Design Consultant and Contractor	DFCCIL	-	No incremental cost

Note: SPCB: State Pollution Control Boards, *No separate EMP cost but in-built as part of Good Construction Practice.

Source: JICA Survey Team

Table 2.23 Environmental Management and Responsibilities during the Construction Phase

No.	Identified Negative impact	Mitigation/Management Measures	Organization		Other Concerned Entities	Estimated Costs of Measures
			Planning and Implementation	Supervision and Responsible		
1	Air Pollution	<ul style="list-style-type: none"> - Consult the local pollution authorities, comply with relevant air quality laws and obtain necessary permissions at least for critically polluted areas before start of any construction related activities. - The air pollution can be observed from the excavation, dismantling activities and emissions from the vehicles and equipment used for construction. - Sprinkling of water at the dust prone areas will reduce dust emissions. - Payload area of the trucks or dumpers should be covered by tarpaulin when transporting soil and crush. Also, construction materials should be stored in covered go-downs or enclosed spaces. - Equipment and trucks will be properly maintained at regular intervals. - Monitoring of air quality <p>*No separate EMP cost but inbuilt as part of Good Construction Practice. However, sprinkling system for prevention of dust emission could cost Rs 300,000 per site</p>	Contractor and Supervisor Consultant	DFCCIL	SPCB	No incremental cost* as all management measures exclude monitoring
2	Noise	<ul style="list-style-type: none"> - Notify the local people in case of blasting operations or similar construction activities associated with higher noise and vibration level. - Construction activities producing high noise levels should be done at different time intervals to curtail the noise levels. - The equipment used should have mufflers to reduce noise levels. All equipment should be properly lubricated. - The construction yards should be surrounded by barriers near the sensitive receptors. The plants absorb noise levels. - Honking should be strictly prohibited in the forest area by the trucks and dumper used for the construction activity. - Construction schedule should be in such a manner to avoid heavy construction near forest areas during the winter season when migratory birds inhabit the area. - Avoid night time activities. Sensitivity to noise increases during the night time hours in residential neighborhoods. - Periodic inspection and effective maintenance of vehicles and equipment - Monitoring of Noise and Vibration Level 	Contractor and Supervisor Consultant	DFCCIL	SPCB	No incremental cost as all management measures exclude monitoring
3	Clearing and Grubbing	<ul style="list-style-type: none"> - If required, vegetation will be removed from the construction zone before commencement of construction after obtaining necessary permissions. - All works will be carried out such that the damage or disruption to flora other than in those areas identified for cutting is kept to a bare minimum. - Trees identified under the project will be cut only after receiving clearance from the Forest Department. - Joint field verification with the respective State FD to avoid uncontrolled and indiscriminate tree felling. - Appropriate compensatory plantation using native species or pollution tolerant species with rate of replacement as per the State FD. For example, for Dahanu eco-sensitive area, ten trees for each tree cut. - Compensation for private land should be based on fruit yield, timber and other economic values. - The need for wood as building materials for workers' temporary housing should be replaced with alternative eco-friendly building materials but if unavoidable, should only be bought from the sustainable source or authorized selling depots in the project area. 	Contractor	DFCCIL	SPCB and Respective State Forestry Department	No incremental cost

No.	Identified Negative impact	Mitigation/Management Measures	Organization		Other Concerned Entities	Estimated Costs of Measures
			Planning and Implementation	Supervision and Responsible		
3	Clearing and Grubbing	<ul style="list-style-type: none"> - Regular and proper water sprinkling near the site to minimize dust deposition on vegetation. - No construction yard should be set up in the forest areas. - Compensate loss of mangrove vegetation by replanting at other mangrove sites after due consultation with the FD and pay legally required compensation fees. - Compensatory plantation for endangered species in degraded forest land near SGNP as per the guidelines of the State FD. - Develop lost water holes at strategic sites inside the forest areas to encourage wildlife movement inside the forest after due consultation with the SGNP Authority. - No earthen material or water from the springs present in the protected area should be used for the construction activity. 	Contractor	DFCCIL	SPCB and Respective State Forestry Department	No incremental cost
4	Disposal of Debris from Dismantling Structures	<ul style="list-style-type: none"> - Comply with relevant laws pertaining to the management and disposal of solid waste and hazardous waste. - Debris will be separated into hazardous material, construction waste (concrete) and organic waste (bio-degradable). - Hazardous waste management plan should be prepared and implemented for disposal of waste oil, batteries and other hazardous materials. - Construction waste will be disposed of at the identified and approved locations. - No disposal will be permitted in the eco-sensitive areas. - Disposal will not be permitted into watercourses. - The disposal sites should be provided with drainage structures. - If solid wastes are to be deposited on private land then necessary permissions and agreements will be obtained. - Remove all garbage, debris and hazardous materials from construction sites and dispose at licensed disposal sites. 	Contractor	DFCCIL	SPCB and Respective State Forestry Department	No incremental cost as all management measures
5	Stripping, Stocking and Preservation of Topsoil	<ul style="list-style-type: none"> - Stockpile will be designed such that the slope does not exceed 1:2 (vertical to horizontal), and height of the pile is restricted to 2 m. To retain soil and to allow percolation of water, silt fencing will protect the edges of the pile. - Stockpiles will not be surcharged or otherwise loaded and multiple handling will be kept to a minimum to ensure that no compaction will occur. - The stockpiles shall be covered with sheets or vegetation. - Proper drainage systems will be provided to prevent stagnation of water. - Reuse top soil from the construction sites for construction of embankment to enhance growth of vegetation on the embankment surface and its consolidation. - Top soils of the borrow pit sites should be conserved and restored after excavation is over. - Use of fly ash and its products as a substitute to top soil 	Contractor	DFCCIL	-	No incremental cost as all management measures
6	Traffic Diversions and Detours	<ul style="list-style-type: none"> - The temporary traffic detours will be kept free of dust by sprinkling water during the day time depending on weather conditions. 	Contractor	DFCCIL	State Transport Department and SPCB	No incremental cost as all management measures

No.	Identified Negative impact	Mitigation/Management Measures	Organization		Other Concerned Entities	Estimated Costs of Measures
			Planning and Implementation	Supervision and Responsible		
7	Borrow Areas and Quarry Sites	<ul style="list-style-type: none"> - Borrow areas and quarry sites should be away from human settlements and sensitive receptors. - The excavation of borrow should be specified as per the guidelines. - Access to the quarry operated area and borrow sites should be strictly controlled. - All workers at the quarry site will be provided with personal protective equipment. - All the haul roads are watered regularly to reduce dust emissions. - A vegetative barrier should be planted to surround the borrow area and quarry sites. - Use of only identified borrow pits and quarry sites to avoid any disfiguring of topography. - Procurement of construction materials from the existing approved and licensed quarry sites only. - The quarry sites should be at least 500 m away from human settlements. - In case quarry sites are close to the freight corridor, trees and other vegetation should be left between the quarry/crushing plant sites and the freight corridor. The vegetation acts as good filters of dust as well as improving environmental aesthetics. - Consult with owner of the site and leave any building, well or any structure if wanted by them. - Compensate for reinstating the landscape and vegetation disturbed during construction activity. 	Contractor	DFCCIL	-	No incremental cost as all management measures
8	Transporting Construction Materials and Haul Road Management	<ul style="list-style-type: none"> - Dumpers and trucks carrying the construction materials should be spill-proof. - Trucks and dumpers should be properly maintained. - Water will be sprinkled on the haulage roads. - Strict speed limits will be followed at the settlement areas and on the haulage roads. - All the truck and dumper drivers will be properly trained. 	Contractor	DFCCIL	State Transport Department and SPCB	No incremental cost as all management measures
9	Construction Water and Wastewater from Construction Yard and Workers' camps / Water Use	<ul style="list-style-type: none"> - Monitoring of water quality - Water required for construction will be drawn from surface water bodies only after obtaining prior permission from the appropriate government departments. - If ground water is drawn then permission from the state ground water authority has to be obtained. - The wastewater from construction yard and workers' camp should be treated before being discharged into surface water bodies to avoid siltation. - Minimize turbidity in the river water by activities such as major earth work for important bridges only during the dry period, care during construction of bridge piers for coffer dams. - Use of only identified groundwater sources by the Central Ground Water Authority based on estimated quantity and expected quality for construction use. - Prepare a comprehensive plan to conserve water using best practices along with artificial recharging mechanism. - The water courses should not be blocked while constructing the corridor, but suitable culverts and drains should be provided for the free flow of water. - Reduce wastage of the existing water resource to avoid possible impacts on the local population's water supply. - Wastewater from the camps should be suitably treated and disposed away from the sites as per the applicable standards and guidelines. 	Contractor and Supervisor Consultant	DFCCIL	SPCB	No incremental cost as all management measures exclude monitoring

No.	Identified Negative impact	Mitigation/Management Measures	Organization		Other Concerned Entities	Estimated Costs of Measures
			Planning and Implementation	Supervision and Responsible		
10	Siltation of Water Bodies / Hydrological condition	<ul style="list-style-type: none"> - Construction of silt fencing at the base of the embankment construction site and around the stockpiles at the construction sites. - The fencing will be provided prior to commencement of earthwork and continue until the stabilization of the embankment slopes on the particular sub-section of the freight corridor is completed. - Construction materials containing fine particles are stored in an enclosure such that sediment-laden water does not drain into nearby water bodies. - Consideration of provision of DFC track through via duct (elevated) instead of filled-in (embankment) in valley regions so that the existing surface and ground water flow are not altered. - No dumping of material into natural drains so as not to block or impede or alter drainage channels. - Adequate cross-drainage channels (longitudinal and median drains) should be provided along DFC route at suitable locations for the smooth passage of the surface run-off to prevent flooding. - Capacity of existing drainage works, cross-drainage structures in the parallel section should be duly augmented, wherever necessary or river channel should be realigned such as between Navsari and Sachin stretch, to accommodate high discharges to avoid flooding of DFC line and formation of water pool. - Suitable drainage at construction site and camp should be provided to avoid formation of stagnant pool of water that lead to soil erosion, water logging and breeding of mosquitoes. 	Contractor and Supervisor Consultant	DFCCIL	SPCB	No incremental cost as all management measures
11	Slope Protection and Control of Soil Erosion	<ul style="list-style-type: none"> - Soil erosion and sedimentation can be minimized by constructing breast walls, retaining walls, pilot bioengineering methods, dykes, sedimentation chambers, basins, fibre mats, mulches, grasses, slope, drains and other devices. After completion of embankment building, the embankment will be turfed for slope stabilization purposes. - Cascading drainage system will be provided for controlling the erosion from the embankments. - Avoid cut and fill operation in the monsoon season. 	Contractor	DFCCIL	-	No incremental cost as all management measures
12	Petroleum Oil and Lubricants (POL)	<ul style="list-style-type: none"> - POL products will be handled with special care. - The necessary permissions will be obtained for handling and use of the POL Products. - The used oil and lubricants will be sold to authorized parties. - The storage places for POL will have restricted entry. - Collect and store used or waste oil in sealed damage-proof containers and may be sold to Central Pollution Control Board (PCB)/State PCB-approved authorized recycler/ re-processor. - Accidental spillage of oil and lubricant will be immediately cleared. - The trucks and dumpers will not be washed at the nearby water bodies, instead they will be cleaned in the construction yard and the waste water will be collected in a settling tank before it can be re-used for some other purposes like gardening etc. 	Contractor	DFCCIL	SPCB	No incremental cost as all management measures
13	Public Health and Safety Risks	<ul style="list-style-type: none"> - Barriers (e.g., temporary fence), shall be installed at construction areas to deter pedestrian access to the freight corridor except at designated crossing points. - The general public/local residents shall not be allowed in high-risk areas, e.g., excavation sites and areas where heavy equipment is in operation. - Speed restrictions shall be imposed on Project vehicles and equipment when traversing areas with sensitive receptors (residential, schools, temples, etc.). 	Contractor and Supervisor Consultant	DFCCIL	-	No incremental cost as all management measures

No.	Identified Negative impact	Mitigation/Management Measures	Organization		Other Concerned Entities	Estimated Costs of Measures
			Planning and Implementation	Supervision and Responsible		
14	Environmental and Social Disruption from Construction Camp	<ul style="list-style-type: none"> - Hire as many local people as possible and train them. - Site construction camps should minimize adverse impacts by good management practices. - Implement malaria control, HIV/AIDS education. - Plan and carry out post-construction site clean-up. - It should be handled with a sensitive approach and carefully resolved between project managers and village leaders/local authorities. - Efforts made to incorporate local/PAP interests into design, construction and operation phases. Requires careful facilitation and again effective participation may require translation/interpretation for fair representation. Also make clear compensatory benefits and what PAPs are entitled to and how to get it. 	Contractor and Supervisor Consultant	DFCCIL	-	No incremental cost as all management measures
15	Risk from Electrical Equipment	<ul style="list-style-type: none"> - No material will be so stacked or placed as to cause danger or inconvenience to any person or the public. - All necessary fencing and lights will be provided to protect the public in construction zones. - All machines to be used in the construction will be kept in good working order, and will be regularly inspected and properly maintained. - Protect all electric sub-stations, high tension towers and other areas from electrocution risk by providing security fencing and lights, warning signs and security patrols. 	Contractor	DFCCIL	-	No incremental cost as all management measures
16	Occupational Safety to the Labour	<ul style="list-style-type: none"> - All site workers will be provided with personal protective equipment such as safety shoes, and helmets - Welders will be provided with eye shields and gloves. - Ear plugs will be provided for workers working in high noise zones. - Workers will not be allowed to work without the appropriate personal protective equipment. - Workers shall be provided with an adequate potable water supply. - Provision of distinguishing clothing or reflective devices or otherwise conspicuously visible material when there is regular exposure of workers to danger from moving vehicles. - Monitoring and control of the working environment and planning of safety and health precautions should be performed as prescribed by national laws and regulations. - Construction camps shall be provided with adequate drainage to avoid accumulation of stagnant water. - Provide proper accommodation to all employees who are working a significant distance from their home. - Provide clean and properly staffed and equipped canteen at all camps. - HIV/AIDS awareness and prevention program shall be implemented under the Project. - The following facilities shall be provided at the workers' camps: <ul style="list-style-type: none"> - Washing facilities or showers shall be provided at the workers' camps. - Toilets/sanitation facilities with proper flushing provisions in accordance with local regulations to prevent any hazard to public health or contamination of land, surface or groundwater. These facilities shall be well maintained to allow effective operation. - Accommodation for taking meals and for shelters during interruption of work due to adverse weather conditions. - First aid room or station under the charge of qualified first aid personnel or a nurse should be provided at a readily accessible place for treatment of minor injuries and as a rest place for seriously sick or injured workers. 	Contractor	DFCCIL	-	No incremental cost as all management measures

No.	Identified Negative impact	Mitigation/Management Measures	Organization		Other Concerned Entities	Estimated Costs of Measures
			Planning and Implementation	Supervision and Responsible		
16	Occupational Safety to the Labour	<ul style="list-style-type: none"> - Construction equipment shall be operated by workers who have received appropriate training in accordance with national laws and regulations. - The drivers and operators of vehicles and materials handling equipment shall be medically fit, trained and qualified and of at least the prescribed minimum age as required by the government rules and regulation. - Suitable scaffolds from the ground shall be provided for the work force, who are working at elevated heights; if a ladder is used, proper foot holds and hand holds shall be provided on the ladder. - Safety provisions shall be brought to the notice of all concerned by displaying on a notice board at prominent places at the work locations. - Secure all construction sites with tamper-proof fence, with security lighting and regular security patrols. - Store and stack all materials and components safely in dedicated secure areas. - Do not use any paint containing lead or its products or material containing asbestos. - The contractor shall be responsible for observance by his sub-contractors of all health and safety provisions. - The contractor should take adequate measures for the control of malaria, typhoid, dengue, cholera etc. - Do regular spray of a mixture made from diesel and insecticides at all water stagnation areas to avoid mosquito breeding and spread of any vector borne diseases. - Mass awareness campaigns and distribution of condoms should be planned. - Handling and implementation should be taken care to avoid accidents. During major excavations, locals must be informed. - All vehicles used in the construction yard should have reverse horns - There should be proper demarcation of work areas with sign boards showing the work areas. The signboards should be in local language. - Equitable opportunities for ethnic and vulnerable groups to participate in consultation processes and receive compensation or benefits. This may require printing of materials in different languages or use of interpreters. - Suitable warnings should be displayed at all places where contact with or proximity to electrical equipment can cause danger. - Persons operating electrical equipment should be fully instructed as to any possible dangers associated with the equipment concerned. All electrical equipment should be inspected before use to ensure that it is suitable for its purpose. - Provide dedicated transport at all work sites to take injured persons to hospitals if needed. - Keep record of all nearest hospitals and health centers at each construction sites. - Water transport tanks, storage tanks and dispensing containers should be designed, used, cleaned and disinfected at suitable intervals in a manner approved by the competent authority. - Water that is unfit to drink should be conspicuously indicated by notices prohibiting workers from drinking it. 	Contractor	DFCCIL	-	No incremental cost as all management measures

No.	Identified Negative impact	Mitigation/Management Measures	Organization		Other Concerned Entities	Estimated Costs of Measures
			Planning and Implementation	Supervision and Responsible		
16	Occupational Safety to the Labour	<ul style="list-style-type: none"> - Provide garbage bins at suitable locations and ensure that each site is tidied and refuse taken to a licensed site regularly. - Secure storage areas should be provided for flammable liquids, solids and gases such as liquefied petroleum gas cylinder, paints and other such materials in order to deter trespassers. - Smoking should be strictly prohibited and no smoking notices be prominently displayed in all places containing combustible or flammable materials - Only suitably protected electrical installations and equipment, including portable lamps, should be used. - Oil rags, waste and clothes or other substances liable to spontaneous ignition should be removed without delay to a safe place. - Fire-extinguishing equipment should be provided at construction camps, asphalt plants, storage areas for combustible materials and other areas where fire hazards are found. Such equipment shall be properly maintained and inspected at suitable intervals by a competent person. 	Contractor	DFCCIL	-	No incremental cost as all management measures

Source: JICA Survey Team

Table 2.24 Environmental Management and Responsibilities during the Operation Phase

No.	Identified Negative impact	Mitigation/Management Measures	Organization		Other Concerned Entities	Estimated Costs of Measures
			Planning and Implementation	Supervision and Responsible		
1	Noise	<ul style="list-style-type: none"> - Noise barriers should be erected at appropriate locations such as residential areas and sensitive receptors which are adjacent to the corridor. - Expand the right of way (buffer zone) as far as practicable as an effective method of reducing the noise and vibration impact. - Ensure and keep correct track geometry by advanced measurement, use of long-welded rails and incorporation of new technologies for structures and rolling stocks to reduce noise and vibration levels. 	EMU	DFCCIL	-	Estimated at the detailed design stage based on detailed land use
2	Maintenance Performance	<ul style="list-style-type: none"> - Monitoring of the operational performance of the various mitigation/enhancement measures carried out as a part of the project. - The indicators selected for monitoring include the survival rate of trees, utility of enhancement provision for relocated utilities, hand pumps and other relocated structures if any, status of rehabilitation of borrow areas, and noise barriers, which are proposed at different locations. - Take immediate actions for speedy cleaning up of oil spills, fuel and toxic chemicals in the event of accidents. - Provision of longitudinal drains of sufficient capacity on both sides of the DFC track to accommodate increased run-off with an outfall in the nearby drainage carrying system. 	EMU	DFCCIL	-	Normal cost of operation
3	Monitoring Environmental Parameters	<ul style="list-style-type: none"> - Monitoring of noise levels at regular intervals along the sensitive locations. - Regular inspection of the entire corridor to clear any accidental spillages of POL products. - Clearing of garbage and waste accumulation from the terminals. 	EMU	DFCCIL	Respective State Pollution Control Boards	Normal cost of operation excluding monitoring
4	Borrow Areas and Quarry Sites.	<ul style="list-style-type: none"> - Incorporate adequate drainage and fill in borrow pits and quarries. Before doing the activity, local concerns should be considered. The village authorities should also be consulted. - Maintain borrow pits and quarries by landscaping them after operation by growing native species. - All borrow areas are to be reclaimed properly and they should be restored to a level that is acceptable level to the land owner. 	EMU	DFCCIL	-	Normal cost of operation
5	Green Belt Development	<ul style="list-style-type: none"> - Monitoring and maintenance of plantation - Plantation along the ROW should be maintained properly as well as protected from illegal cutting. - Green Belt would arrest the noise levels. 	EMU	DFCCIL	-	Normal cost of operation
6	Staff Training	<ul style="list-style-type: none"> - The training should be for all the executives regarding the environment and safety. - The process should be for a minimum period of first six months. 	EMU	DFCCIL	-	Normal cost of operation

No.	Identified Negative impact	Mitigation/Management Measures	Organization		Other Concerned Entities	Estimated Costs of Measures
			Planning and Implementation	Supervision and Responsible		
7	Disaster / Safety	<ul style="list-style-type: none"> - Maintenance of cross-drainage channels (longitudinal and median drains) should be carried out. - Provide proper warning signals, alarm system to warn people of oncoming trains. - Provide safety walls in accident prone areas. - Do initial awareness campaigns on safety instructions and precautions in nearest villages and communities along the alignment route. - Incorporate safety measures into the design to discourage people from gaining access to the DFC line. - Incorporate some appropriate structures into the design such as underpasses, pipe culverts and/or other crossing structures as needed to allow wildlife to cross line safely. 	EMU	DFCCIL	-	Normal cost of operation

Source: JICA Survey Team

2) Organizations Responsible for the Different Phases

Construction

- State Pollution Control Board: At the time of construction for giving the necessary permissions for the construction yards and the equipment brought for the construction activity.
- State Department of Mines and Minerals: The Department is responsible for giving all necessary permissions for the borrow sites and quarry pits.
- State Department of Irrigation: if the contractor uses surface water or river water, then necessary permission from the Irrigation Department is needed.
- State Groundwater Authority: If the Contractor uses ground water for the construction then necessary permission should be obtained from State Groundwater Authority.
- State Forest Department: Cutting any forest trees or encroaching into the forest land requires the permission from the Forest Department.
- State Labour Department: The labour laws are strictly to be followed during the construction and at the time of operation.
- State Department of Explosives: The Contractor should obtain necessary permission for using explosives and for storing the same.
- State Pollution Control Board will also play a major role for hazardous material management.
- The Disposal of Waste requires proper permission from the local municipal authorities.
- The road crossing requires permissions from the National Highway Authority (NHA) of India or from the State Government Highway Department.
- For utilities like the pipelines, the permissions are required from the respective State water Boards.
- Utilities like power transmission lines requires permission from the State Electrical Department.
- State Transport Department: The necessary permission for the construction vehicles should be obtained from the State Transport Authority.
- The State Police and the State Medical Departments are considered during any exigencies.

Operation

The most important government agencies during the operation stage are the Ministry of Railways, Local Administration, Forest Department and SPCB.

2.9.2 Environmental Monitoring Plan (EMoP)

(1) Introduction

An EMoP provides a basis for monitoring potentially adverse environmental impacts of the project during its execution. The information derived from environmental monitoring activities can be used to mitigate and reduce environmental impacts and enhance project benefits through adaptive management. The implementation of the EMoP is adopted in all project works. An EMoP is important as it provides useful information and helps to:

- Assist in detecting the development of any unexpected environmental or social situation and thus provides opportunities for adopting appropriate control, management or mitigation measures;

- Defines the responsibilities of the project proponents, site engineers, contractors and environmental monitors and provides means of effectively communicating environmental issues among them;
- Defines the monitoring mechanism and identifies monitoring indicators, methods and parameters;
- Provides information which allows for the evaluation of the performance and effectiveness of mitigation measures proposed in the EMP and enables managers to make improvements in the management plan;
- Identifies training requirements at various levels.

(2) Environmental Monitoring Plan

The EMoP involves two main types of activities as follows:

Routine supervision of the work: Observation of the construction/operation work to ensure mitigation measures will be implemented during routine site inspections. This work will be conducted as general operation working/maintenance progress including daily work. (See Table 2.25)

Environmental and social impact/mitigation monitoring: The monitoring to be conducted to determine the actual and social impacts. (See Table 2.26)

Table 2.25 Environmental Monitoring Plan - Supervision Work

No.	Environment Component	Project Stage	Issue	Mitigation Management	Supervision Method	Duration /Frequency	Organization	
							Planning and Implementation	Supervision and Responsible
1	Social impact	Planning /Design phase	To ensure that the adverse impacts of land and property acquisition and resettlement are addressed and compensated	<ul style="list-style-type: none"> - Inventory of losses - Implementation of RRP - Public consultation 	<ul style="list-style-type: none"> - Check notification and DFC payment record 	Monthly	Design Consultants	DFCCIL assisted Supervision Consultant and SPCB inspecting
		Const- ruction	To ensure that the adverse impacts of construction activities are minimized and mitigated	<ul style="list-style-type: none"> - DFCCIL will employ an NGO to address resettlement issues associated with the project. 	<ul style="list-style-type: none"> - Check if the community has brought the problem to the notice of the Consultant and Client 	Monthly	Constructor	DFCCIL assisted Supervision Consultant and SPCB inspecting
2	Crops and Vegetation	Planning /Design phase	To minimize the direct impacts on crop production and other vegetation	<ul style="list-style-type: none"> - Clearing of surface cover for construction for borrow pit, cutting trees and other important vegetation during construction should be minimized - Follow procedures with regard to spoil dumping - Replacement of topsoil and restoration of vegetative cover 	<ul style="list-style-type: none"> - Interviews with local residents will also help in this matter. 	Before commencement date	Design Consultant	DFCCIL and Supervision Consultant
3	Impacts on Freight Corridor Design	Planning /Design phase	To ensure that the recommendations given with the conditional approval by the DFCCIL and followed by design consultant	<ul style="list-style-type: none"> - ROB and RUB have been designed - Existing irrigation, protection measures have been identified. 	<ul style="list-style-type: none"> - Check final design drawing and original plan 	Before the commencement of construction activities	Design Consultants	DFCCIL assisted Supervision Consultant
4	Air Pollution	Const- ruction	To minimize air pollution from freight corridor construction	<ul style="list-style-type: none"> - Watering on earthen surfaces especially in the settlement areas - All construction vehicles should be maintained in good condition to minimize emissions. 	<ul style="list-style-type: none"> - Check watering as per the frequency given in the EMP. - Proper implementation can be achieved by site inspection along with interviews with local residents. 	Weekly One check	Contractor	DFCCIL

No.	Environment Component	Project Stage	Issue	Mitigation Management	Supervision Method	Duration /Frequency	Organization	
							Planning and Implementation	Supervision and Responsible
5	Noise and Vibration	Planning /Design phase	To minimize the noise and vibration level resulting from freight corridor To control noise pollution from exceeding tolerable levels on embankment sections taking into account the increase in traffic volume	- Establishing standards and regulations for noise levels for various equipment used at the site - Strict enforcement of regulations. - Awareness programs	- Determination of critical sites and methods of mitigation during the construction period.	Monthly/ As necessary	Design Consultants	DFCCIL assisted Supervision Consultant
		Construction	To minimize the noise and vibration level resulting from road traffic, to control noise pollution from exceeding tolerable levels on embankment sections taking into account the increase in traffic volume	- All road construction vehicles must have working mufflers and be maintained in good condition - Noise barriers should be established around the yard near residential areas and sensitive receptors during activities such as blasting and pile driving.	- Check that the Contractor is performing mitigation measures. - This can be achieved by interviewing the locals and by site inspection.	A monthly inspection of the construction yards must be carried out.	Contractor	DFCCIL
		Operation	To minimize the noise and vibration levels resulting from rolling stocks	- Maintenance of the rail, sound barrier as well as equipment rolling stock	- Visit site and compare with normal situation	Periodical	EMU	DFCCIL assisted Supervision Consultant
6	Water Quality	Planning /Design phase	To control the impacts on the quality of surface and groundwater	- Maintain existing concentrations of chemicals, sediments and water at specific locations. - Design appropriate mitigation measures	- Check final planning and approve if proposal is suitable	Before the commencement of construction activities	Design Consultants	DFCCIL assisted Supervision Consultant

No.	Environment Component	Project Stage	Issue	Mitigation Management	Supervision Method	Duration /Frequency	Organization	
							Planning and Implementation	Supervision and Responsible
6	Water Quality	Const- ruction	At the bridge construction areas	- Avoiding chemical discharge and spills in soil and water at specific locations like bridge construction areas. Design appropriate mitigation measures	- Visit site and check drain provision/functioning	During the construction stage a weekly site inspection is necessary for the proper assessment of the site.	Contractor	DFCCIL assisted Supervision Consultant
7	Oil Spills and Hazardous Wastes	Const- ruction	To avoid and minimize oil spills and spills of other hazardous wastes	- Establish standards for safe handling, storage and transport to avoid spills - Establish emergency response and containment/ clean up procedures	- Check the mitigation measures. - A fortnightly inspection is necessary until the completion of the project.	One check	Contractor	DFCCIL
8	Spoil Disposal	Const- ruction	To ensure adequate disposal options for spoil	- Identify sufficient locations for disposal sites and design disposal sites in the contract	A monthly inspection of the disposal sites along with the review of the design plan is a better way of assessment.	Weekly	Contractor	DFCCIL
9	Construction Waste Disposal	Const- ruction	To minimize the impacts from the disposal of construction waste	- Preparation and implementation of waste management plan based on estimating the amount of construction waste	Interviews with local residents will also give a proper assessment of the issue.	Weekly	Design Consultants and Contractor	DFCCIL
10	Land Slide and Soil Erosion	Planning /Design phase	To minimize landslides resulting from excessive erosion of slopes and water ways with corresponding silting of the eroded soil.	- Maintaining proper vegetation cover and erosion protection - Constant surveillance as part of routine maintenance	Visit site and Check land plans, alignment	Site visits, one check	Design Consultants	DFCCIL
		Const- ruction	Constructed embankments could be a source of silt if not protected from erosion by rain fall	-Work plan: excavation and embankment works mainly during the dry season	A site inspection along with the review of the design plans is necessary.	During construction and specially during rainy seasons	Contractor and Supervision Consultant	DFCCIL

No.	Environment Component	Project Stage	Issue	Mitigation Management	Supervision Method	Duration /Frequency	Organization	
							Planning and Implementation	Supervision and Responsible
11	Loss of or Damage to Religious Places and Eco-sensitive Areas.	Planning /Design phase	To minimize damage to religious sites and eco-sensitive areas	<ul style="list-style-type: none"> - Avoid encroachment on religious and eco-sensitive areas in planning the alignment 	Check encroachment on religious and eco-sensitive areas	- Before and during construction phase	Design Consultant, DFCCIL	DFCCIL assisted Supervision Consultant
12	Earthworks Operation	Construction	To ensure that the earthworks are safe and do not have adverse environmental impacts	<ul style="list-style-type: none"> - Use appropriate designs and size of drainage structures in accordance with designs approved by the client, - Structural stabilization of drainage system - Hauling material to be carefully transported to designated dumping areas 	<ul style="list-style-type: none"> - Ensure the contractor performs detailed design and instability checks - Check if erosion or instabilities were observed. - The conditions at the site can be observed by a site inspection along with review of the design plan. 	Before commencement date of construction	Contractor and Supervision Consultant	DFCCIL
13	Traffic Safety	Planning /Design phase	To avoid and minimize traffic accidents during construction	<ul style="list-style-type: none"> - Install traffic markings such as sign boards - Observe speed limits - Safe loading and covering of materials being transported - Planning of transport routes 	Visit site and Check around traffic situation and construction plan	- Before commencement date of construction	Contractor	MoEF, DFCCIL. State Ministries, PMC and Supervision Consultant.
		Construction	To avoid and minimize traffic accidents during construction	<ul style="list-style-type: none"> - Traffic sign boards for proper movement of construction vehicles, - Limit speed of vehicles - Safe loading and covering of materials being transported - Planning of transport routes 	Checking the traffic problems at the construction site.	Monthly	Contractor and Supervision Consultant	DFCCIL
14	Disturbance to Flora	Construction	To minimize direct impacts on vegetation Prevent damage to vegetation outside ROW	<ul style="list-style-type: none"> - Prohibit vegetation cutting outside ROW - Record ROW-, check no cutting out side 	Inspect ROW boundary and adjacent area	Weekly/Monthly	Contractor and Supervision Consultant	DFCCIL

No.	Environment Component	Project Stage	Issue	Mitigation Management	Supervision Method	Duration /Frequency	Organization	
							Planning and Implementation	Supervision and Responsible
15	Disturbance to Fauna	Const- ruction	To minimize direct impacts on fauna. This applies in the case of Gulisthanpur and at Aravalli region and at Eco-sensitive areas in Maharashtra	<ul style="list-style-type: none"> - Consultation with Forest Department Authorities and Department of Wildlife. - No construction camps or quarries in wildlife habitat areas eg. eco-sensitive areas - Avoiding alignment of route within sensitive habitats of important species, keystone tree species, conservation areas etc. - No hunting, poaching, or unnecessary habitat destruction - Training for staff working in wildlife areas (or at least briefings) 	Visit site and check the proposed alignment and construction area	Monthly	Contractor and Supervision Consultant	DFCCIL
16	Plantation	Operation	Growth of development trees	-	<ul style="list-style-type: none"> - The number of trees surviving during each visit shall be compared with the number of sapling plant - Record the growth of plantation 	Assess growth every year for initial five years	SEMU	DFCCIL
17	Mangroves	Const- ruction	The impact on the mangroves should be minimized. This should be observed in the State of Maharashtra	<ul style="list-style-type: none"> - Avoidance of mangroves in the alignment - Not to encroach into the mangrove areas. - Proper disposal of construction waste material should be strictly enforced - No storage should be allowed near the sensitive areas. 	Visit site and check the proposed alignment and drain/waste material around mangroves	Monthly	Contractor and Supervision Consultant	DFCCIL Supervised by District Authorities (Maharashtra), SPCB, State Environment Department,

No.	Environment Component	Project Stage	Issue	Mitigation Management	Supervision Method	Duration /Frequency	Organization	
							Planning and Implementation	Supervision and Responsible
18	Loss or Damage of Cultural Sites or Religious Places	Const- ruction	To avoid or minimize damage to cultural sites or religious places.	<ul style="list-style-type: none"> - Avoid alignment encroachment on cultural sites - Local population will also be consulted if there are any religious places 	Interviews with local residents will also give a proper assessment of the issue.	Before and during construction. Monitoring should be done once in six months.	Contractor/ Subcontractor and Supervision Consultant	DFCCIL
19	Construction Labour Force and its Impacts	Planning /Design phase	To minimize impact on workers	<ul style="list-style-type: none"> - Establish minimum standards for construction workers camp layout and housing provision, provide sanitary facilities and insect control particularly as related to Malaria and other vector-borne diseases 	<ul style="list-style-type: none"> - Check construction workers camp layout and equipment 	Before the start of construction work As necessary	Constructor	DFCCIL
		Const- ruction	To minimize impact on workers during construction	<ul style="list-style-type: none"> - Conduct special briefing on site training on environmental requirements and safety for the workers. - Strictly instruct workers not to interfere in local affairs 	<ul style="list-style-type: none"> - Check the Contractors are following the Mitigation measures - Check with the communities and construction staff if any conflict has occurred, if yes find out reason. - This can be achieved by regular site inspections. The frequency should be once in fifteen days. 	Weekly	Constructor	DFCCIL assisted Supervision Consultant and SPCB inspecting
20	Work Camp Operation	Const- ruction	To ensure that the operation of work camps does not adversely affect the surrounding environment and residential areas	<ul style="list-style-type: none"> - Identify sufficient locations for disposal sites and design disposal sites in the contract - The location shall be approved by the consultant 	During construction and after completion of the works. The inspection should be planned once every two months throughout the project period	Monthly	Contractor and Supervision Consultant	DFCCIL

Source: JICA Survey Team

Table 2.26 Environmental Monitoring Plan – Impact and Mitigation Monitoring

No.	Environment Component	Project Stage	Environmental Monitoring Program				Institutional Responsibility		Estimated Cost
			Parameters	Methodology	Location	Duration /Frequency	Implementation	Supervision	
1	Air Pollution	Construction	PM ₁₀ , PM _{2.5} , CO, SO ₂ , NO _x , Lead	Analysis as specified in the National Ambient Air Quality Standard	At construction sites in sensitive and critical areas along alignment. Final decision shall be taken in consultation with SPCB.	24 hours or 8 hours (CO), at least once in every season (once in 3 months) except monsoon for minimum 3 days. The frequency of monitoring will depend on the sensitivity of locations and the extent of construction activities.	Construction Contractor through MoEF Approved Laboratories	DFCCIL assisted Supervision Consultant and SPCB inspecting	Rs. 100,000 per site per season
2	Noise and Vibration	Construction	Noise level in dB (A) and Vibration in dB	Ambient Noise level is measured with the noise level meter according to the Noise (regulation and control) rule. Ambient Vibration level is measured with vibration level meter according to international standard.	Next to identified sensitive receptor along alignment basically near predicted points, major construction site in any inhabited areas as well as the operational areas like crusher units and batch mixing plants	Hourly records, for 24 hours for minimum 3 days, 4 times a year (preferably in each season)	Construction Contractor	DFCCIL assisted Supervision Consultant and SPCB inspecting	Rs. 50,000 per site per season
		Operation	Railway Noise level in dB (A) and Vibration in dB	Noise level emitted from rolling stocks is measured with noise level meter according to international standards. Vibration level emitted from rolling stocks is measured with vibration level meter according to international standard.	Next to identified sensitive receptor along alignment basically near predicted points	Monthly during first operation year, Once a year	SEMUR	DFCCIL	No separate cost
3	Water Quality	Construction	See Note	Sampling and analysis as per Standard Methods for Examination of Water and Wastewater	Surface water: at two points of (upstream and downstream) 14 Important Rivers	Monthly during construction periods near the river	Construction Contractor	DFCCIL assisted Supervision Consultant and SPCB inspecting	Rs. 5000 per river per month
					Ground water: location shall be decided by SPCB	Monthly during construction/excavation periods			Rs. 5000 per location per month
					Drinking water and waste water: each labour camps	Weekly			Rs. 10,000 per sample per week

No.	Environment Component	Project Stage	Environmental Monitoring Program				Institutional Responsibility		Estimated Cost
			Parameters	Methodology	Location	Duration /Frequency	Implementation	Supervision	
4	Ground water level	Construction	ground water level	Measurement of ground water level	Dahanu Taluka and Aravalli site. The location shall be decided by SPCB	Before construction; monthly During construction/excavation periods; continuous	Construction Contractor	DFCCIL assisted Supervision Consultant and SPCB inspecting	Rs. 5000 per site per month
5	Land slide and Soil Erosion	Construction	Surface status of ground modification	Contractor report implementation of the measures for land slide and soil erosion preservation	A site inspection along with the review of the design plans if necessary.	Rainy seasons.	Construction Contractor	DFCCIL and Supervision Consultant.	No separate cost
6	Plantation	Construction	Number of railway side plantation	Progress of measures suggested as part of the strategy is to be reported.	Along the side of the track	Comparison should be done every six months	Construction Contractor	DFCCIL assisted Supervision Consultant and SPCB inspecting	Rs 10,000 per person per 30 km

No.	Environment Component	Project Stage	Environmental Monitoring Program				Institutional Responsibility		Estimated Cost
			Parameters	Methodology	Location	Duration /Frequency	Implementation	Supervision	
7	Borrow Area	Construction	Borrow areas redevelopment	Location of borrow areas have to be finalized from identified lists and parameters indicative of environment in the area has to be reported. Undertaking site visit to determine how many borrow areas have been rehabilitated in line with the landowners request and to their full satisfaction	Identified borrow areas	4 times a year (preferably in each season)	Construction Contractor	DFCCIL assisted Supervision Consultant and SPCB inspecting	No separate cost

Note: Odor, conductivity, pH, DO, BOD, TDS, TSS, oil and grease, chlorides, sulphates, total nitrogen, total phosphate, coli forms and heavy metals

SPCB: State Pollution Control Board

Source: JICA Survey Team

2.9.3 Grievance Redress Mechanism under EMP

The main complaints associated with railway projects are normally related to the process of compulsory acquisition of land and property, and include the amounts of compensation offered, the way the process is conducted, and other issues. For this project these and other related matters will be dealt with through a Grievance Redress Mechanism (GRM) for Land Acquisition and Resettlement, which was established via the RRP. This involves consideration by Grievance Redress Committees at local/field and headquarters/central levels if necessary, with further recourse to the Competent Authority and an official government arbitrator/ombudsman if necessary.

Grievances/complaints on environmental matters are expected to be relatively few and more straightforward, so a simplified procedure is more appropriate in this case. Local concerns mainly arise as a result of inappropriate implementation of the EMP and EMoP, the main aim of which is the reduction of negative impacts to acceptable levels. These issues are best addressed through open dialogue and a responsive approach, with frank acknowledgement of errors where appropriate, followed by rapid remedial action. This will be the principal philosophy of the Environmental GRM.

The CPM office will be the point of contact for any such grievances, and local communities will be informed of this at consultation meetings. Any complaints will firstly be assessed to determine whether they are genuine and reasonable, and where this is the case, the CPM will meet to discuss the issue with the APM-Environment and other relevant officers and senior managers from the Contractor and Engineer when relevant. Affected sites will also be visited and inspected. The CPM will respond in writing to the complainant within 30 days of receipt, and will give the decision, with an explanation of the rationale and proposed remedial action where appropriate.

If an acceptable solution cannot be agreed locally, the matter will be referred to GM-SEMU, who will consult within DFCCIL as necessary and inform the complainant in writing, again within 30 days of receipt. He will take into account the views of the CPM and the complainant, and any precedent set by responses to similar complaints in other CPM areas in either Eastern or Western Corridors. He may also seek expert advice from others as may be necessary. DFCCIL will consider the response from the CPM or GM-SEMU as final, though the complainant can seek further redress through the courts if he wishes.

Any complaints relating to deficient design or matters of policy will be referred immediately to GM-SEMU, who will consult with relevant DFCCIL officers and senior representatives of Contractors and the Supervision Consultant as appropriate, before responding to the complainant as above.

In all cases, remedial action will be implemented by the appropriate agency (Contractor, Supervision Consultant or DFCCIL head office or CPM), and the agency and responsible officer will be identified in the written response. A timescale for completion will also be given. The affected party will be entitled to make a further complaint if he feels the action has not addressed the problem or has not been conducted adequately.

DFCCIL will keep a record of all complaints received and actions taken to resolve, and will monitor the degree of satisfaction of complainants regarding the outcome.

2.9.4 Reporting Arrangement

Effective project management and supervision requires clear monitoring and reporting structures in order to ensure that the project is being implemented in accordance with the specifications of the EMP. Monitoring and progress reporting enables managers to make timely decisions that address project bottle-necks and social and environmental issues or problems arising.

The monitoring and evaluation of management and mitigation measures envisaged are critical activities in implementation of the project. Monitoring involves periodic checking to ascertain whether activities are going according to plan. It provides necessary feedback for the project management to keep the program on schedule and delivering against the requisite standards and targets. The reporting system is intended to demonstrate accountability and as a means of ensuring that mitigation measures are implemented as per the EMP. The main actors in the monitoring and reporting process are:

DFCCIL: The client holds overall responsibility for the implementation of the environmental mitigation measures and the sole responsibility would lie with the Supervision Consultant recruited by the Client in implementing the EMP and other project activities. The Supervision Consultant will interact with the client on a regular basis and inform the client about progress and issues arising.

Supervision Consultant: The Supervision Consultant should be involved in implementation of the mitigation measures and in developing the required training materials for the client. The various tasks to be performed during the project cycle are:

- Monitoring the progress of the project with regards to the implementation of the environmental provisions as per planned schedule;
- Supervising and implementing the mitigation measures;
- Assist the engineers on site by providing appropriate mitigation measures;
- Documenting the experience in the implementation of the environmental process.

The environmental and social consideration experts of the Supervision Consultants will have the following responsibilities:

- Review the ESIA and RRP documents for the Project;
- Liaise with the central and state Environmental Departments and the Pollution Control Boards;
- Continuous interaction with stakeholders and local communities in implementing the EMP; and
- Preparation of the environmental compliance reports for the client and the funding agency (JICA) at regular intervals.

Contractor: The supervision consultants should have a role in advising the contractor on key environmental and social issues and mitigation measures and how they should be implemented. The contractor should adopt environmentally sound practices. The contractors should have sufficient environmental awareness necessary for the successful completion of the work entrusted. The activities envisaged are:

- Develop and detail an implementation plan for the environmental management, mitigation and monitoring specified in the EMP and EMoP;
- Continuous interaction with the environmental specialist of the Supervision Consultant and Project Management Consultants;

- For all activities, there should be a formal approval from the Supervision Consultant;
- Liaise with the Government Agencies like SPCB and other Government Departments; and
- Carrying out environmental monitoring.

2.9.5 Costs for EMP and EMoP

Table 2.27 shows the approximate costs for the implementation of the EMP and EMoP. Detailed cost will be estimated in the preparation of the Environmental and Social Management and Monitoring Plan (ESMMP) during the Engineering Consultancy Service stage. There is a possibility that additional cost for mitigation, which is not clear at this stage, maybe need by the progress of the detail design. (e.g. cost for plantations, noise barrier, etc)

Table 2.27 Indicative Costs for Implementation of the EMP and EMoP

Environmental issues	Quantity	Unit	Lump sum cost (US\$)	Total cost (US\$)
1. Mitigation cost				
Maintain borrow pit site by landscaping and re-planting after operation	1	site	5,000	5,000
Maintain quarry site by landscaping and re-planting after operation	1	site	10,000	10,000
Remove the base soil of detour and re-plant after operation	Lump sum	site	-	100,000
Water the road in the settlement areas when dust seem to be arise	36	month	2000	72,000
Re-plant where riverside vegetation is cleared by bridge construction	15	bridge	5000	75,000
Make workers aware on STD and HIV/AIDS	lump sum		20000	20,000
Post-construction clean-up to ensure no dangerous debris are left behind the camp site	Lump sum	Camp site	-	100,000
			Sub-total	382,000
2. Training (Three modules)	6X50,000			300,000
Total			Total	682,000

Source: JICA Survey Team

2.10 CONCLUSIONS AND RECOMMENDATIONS

Major findings from the ESIA study have been provided in Table 2.28.

Table 2.28 Major Findings from the ESIA

Item	Issue	Findings	Responsible organization	Remarks
Alignment Route				
Rewari-Dadri • Detour	Alignment route	It passes near settlement areas in Bukharpur, Faridabad, and Lakhuwas, Gurgaon	<ul style="list-style-type: none"> • Survey agency • DFCCIL 	Fencing to be installed to avoid accidents.
JNPT-Vadodara • Parallel with existing track • Detour	Alignment route	In Gujarat, it will disturb the productive agricultural land in detour section. In parallel section, ROW was noted 20-30 m in semi-urban areas, which will have high impact of vibrations and noise	<ul style="list-style-type: none"> • Survey agency • DFCCIL 	ROW to be decided with approach of long term planning, not with the immediate settlement issues.

Item	Issue	Findings	Responsible organization	Remarks
Pollution Control				
Air Pollution	Minor impact during construction phase	The construction work would emit some amount of air pollutants, so it requires regular monitoring and sprinkling at the dust prone areas	Contractor under the supervision consultant.	Mitigation measures to be implemented as and when it is required
Water Pollution	Minor impact during construction phase.	<ul style="list-style-type: none"> The construction yards and the labour camps are the worst offender, unless some proactive measures are taken The best way of handling is to provide soakage pits and settling tanks. The waste water to be regularly monitored. The ground water sources along the construction yard should be tested for the bacterial load. 	Contractor under the supervision consultant.	Regular water quality monitoring shall be conducted.
Noise and Vibration	Major impact near residential areas and sensitive receptors	<ul style="list-style-type: none"> Construction activities emit a large extent of noise and vibration levels. The contractor should give an awareness campaign for the locals about the likely impacts. Suitable mitigation measures to be implemented during operation. 	Contractor under the supervision consultant.	<ul style="list-style-type: none"> Mitigation measures to be implemented during vibrating roller usage, compaction, and blasting activity. Necessary precautionary measures to be implemented on site.
Groundwater Table	Precaution to be taken near tunnel and bridge construction sites.	The nearby wells around the quarry and borrow pits should be regularly monitored as there will be fluctuations in the water table.	Contractor under the supervision consultant.	-
Soil	Precaution should be taken for waste disposal and soil erosion.	<ul style="list-style-type: none"> Erosion due to vegetation clearance Waste dumping 	<ul style="list-style-type: none"> DFCCIL Contractor under the supervision consultant. 	-
Natural Environment				
Tree Cutting	All trees falling under the ROW will be cut.	<ul style="list-style-type: none"> The extent of tree cutting can be curtailed by afforestation. Native plant species should be selected for afforestation. 	<ul style="list-style-type: none"> Department of Forest Department of Horticulture 	<ul style="list-style-type: none"> Tree cutting should be minimised to the maximum extent as possible. Compensatory afforestation of native tree species.
Forest area	Forest area encroachment	<ul style="list-style-type: none"> Encroachment to be restricted. The eco-sensitive areas like mangroves are to be preserved and rehabilitated. 	<ul style="list-style-type: none"> Department of Forest Department of Wildlife 	<ul style="list-style-type: none"> It is better to avoid the forest and eco-sensitive areas to the maximum extent as possible.

Item	Issue	Findings	Responsible organization	Remarks
Flora and Fauna	No major impact	The proposed corridor is not affecting any dense forest area or habitat of endangered species.	-	-
Social Environment				
Land Acquisition	Compensation cost evaluation	During land acquisition, some portions of agricultural land will be bifurcated and may not be of any use for the PAP.	<ul style="list-style-type: none"> Ministry of Railways DFCCIL District administration 	<ul style="list-style-type: none"> Compensation to be provided for damaged land as well, if in case it is not being acquired.
PAPs	The proposed intervention will not give direct profit to PAPs.	Different categories of PAPs have their own issues of concern.	<ul style="list-style-type: none"> DFCCIL District administration 	<ul style="list-style-type: none"> Problem is more severe in semi-urban areas for loss of residential houses. Small land holding PAPs with no other source of income need support on livelihood recovery.
Vulnerable People	About 14% of vulnerable persons will be affected; this includes elderly people comprising more than 11%.	Elderly people, unmarried girls, and widows may have serious issues.	<ul style="list-style-type: none"> DFCCIL District administration 	Wisely utilization of the compensation-awareness should be given to vulnerable persons.
Loss of Agricultural Land and Properties	Major impact	<ul style="list-style-type: none"> The land and property acquisition should be minimum. Give proper value for the lost property. 	<ul style="list-style-type: none"> DFCCIL District administration 	The land and property acquisition should be minimum.
Impacts to Religious Places	Religious structures will be affected by ROW and those coming near the alignment will have impact due to vibration and noise.	Religious places should be avoided or relocated after considering the public opinion.	<ul style="list-style-type: none"> DFCCIL The local communities should be taken into consideration while handling this religious matter. 	It is a sensitive issue and it requires careful handling.
Rehabilitation and Resettlement	Livelihood recovery for PAPs	RRP is required.	DFCCIL	Baseline Survey and Census will generate the basis for RRP.

Source: JICA Survey Team

CHAPTER 3 ASSISTANCE IN ORGANIZATION PUBLIC CONSULTATION MEETINGS (PCM) REGARDING ESIA

3.1 INTRODUCTION

PCM is a critical component of a comprehensive ESIA. PCM offers an opportunity for the people to participate in the decision making process leading to project design, development and implementation. It provides a platform for the project-affected persons and different stakeholders to express their views on possible impacts of the proposed intervention on environmental and social parameters so that their opinions and comments could be incorporated and analyzed in the ESIA report.

The objectives of PCM are to incorporate the opinions and suggestions of the public and all other stakeholders at the project planning stage to ensure wider acceptability of the project. The key objectives are to:

- Provide information on the economic, environmental and social benefits as well as potential negative impacts from the Project;
- Ensure that the potential PAPs, stakeholders and local communities are engaged in a meaningful dialogue and are well informed prior to the decision of the DFCCIL, as to the nature and extent of social and environmental impacts attributable to the proposed project with respect to the alignment, schedules and plans;
- Ensure that the concerns of, and issues raised by the PAPs, stakeholders and local communities are incorporated and adequately addressed in the ESIA study;
- Engage in a participative exercise with PAPs, stakeholders and local communities and obtain expertise and local, traditional wisdom and knowledge from them in order to plan mitigation measures; and
- Facilitate periodic opportunities for the principal stakeholders to offer their inputs on all key components of the Project.

In order to meet the requirements as well as to achieve the aforesaid objectives, the JST assisted in the planning, preparation, coordination, and implementation of PCMs for ESIA at two different stages to collect opinions and feedback of the public. The SEMU of DFCCIL and respective CPM offices were involved in every step of the process starting from the identification of stakeholders, selection of venues, finalization of documents for distribution to public during PCMs, and arrangement procedures at venues including appropriately answering the queries of the participants on the day of each PCM. There was a substantial shift in the understanding and ownership of the PCMs among DFCCIL and respective CPM offices from the first stage PCM to the second stage PCM.

(1) First Stage of the PCM for ESIA (PCM for ESIA Scoping Stage)

The first stage of the PCM for ESIA was conducted during the environmental scoping in the initial stage of the ESIA study. Information on the Project and scope of the ESIA Study was disseminated to the public, and then comments and opinions were collected to be incorporated in the ESIA study.

(2) Second Stage of the PCM for ESIA (PCM for Draft Final ESIA Report Stage)

The second stage of the PCM for ESIA was conducted during the preparations of the draft final report of the ESIA study. Information about the findings of draft environmental and

social impact assessment study and mitigation measures were explained to the general public that are directly or indirectly affected by the DFC Project. Their feedback and opinions were collected which are reflected in the final ESIA report together with their comments and requests on the environmental and social mitigation measures and EMP and EMoP.

The JST assisted in implementing the entire process of PCMs with support from a local consultant to ensure widest possible public participation in these meetings.

3.2 PCM FOR SCOPING

3.2.1 Approach and Methodology of PCM for Scoping

(1) Target Area

The JST assisted to organize district-wise PCMs in all 14 affected districts. These meetings were held at venues convenient to PAPs and other stakeholders and timings were arranged to suit their preferences. It was kept in mind to invite stakeholders from all villages of affected area so that opinions from all concerned could be addressed.

(2) Stakeholder Identification

Target invitees to the PCMs were the general public living along the DFC alignment or boundaries of the relevant facilities. Different categories of stakeholders ranging from PAPs to government officials to members of different civil society groups were identified and invited in order to seek their opinions on the Project and to discuss social and environmental impacts. The various categories of stakeholders who were invited to attend both the stages of PCMs were as follows:

- PAPs;
- Government officials from the local administration, revenue department, land acquisition officer, forest officers, police officers, and railway officials;
- Representatives from Gram Sabha and Gram Panchayat, such as Sarpanch (Village head), other elected members of Gram Panchayat, and Numberdar (Village Headman)²;
- Local municipal bodies, members of parliament and the legislative assembly of the area, and elected members of the Zila Parishad³;
- Local industry owners;
- Residents, merchants/businessmen, advocates, farmers, senior citizens.

(3) Facilitators

The JST utilized the potential of local associates to assist to carry out these PCMs. Their acquaintance with different sections of society and their ability to mobilize the stakeholders to attend the meetings were useful in the successful completion of the meetings. The following considerations were kept in mind while entrusting the responsibility of facilitating the PCM meetings:

² Numberdar (Village Headman) is a traditional social position in a village and a nominated person work for a longer period whereas Sarpanch (Village Head) is a political and democratically elected head of a village-level statutory institution of local self-government called the gram panchayat (village government) and is for a fixed tenure.

³ Zila Parishad (District Council) is a local government body at the district level.

- Identification of suitable venues for the meetings;
- Preparation of logistical arrangements such as food, stationary distribution and public address system;
- Assisting in publicity in local languages (Hindi, Gujarati, and Marathi);
- Distributing invitations to stakeholders and motivating them to participate in the meeting;
- Maintenance and compilation of meeting records; and
- Other arrangements such as transport, security and smooth conduct of the meeting proceedings.

(4) Method of Information on PCMs

The JST engaged the local consultants to visit all the affected villages and inform all PAPs and other stakeholders about the meetings. The following methods were used for notifying participants:

- The JST prepared all invitation letters and forwarded these DFCCIL and respective CPM offices for review and approval. These invitation letters were also translated to local languages (Hindi, Marathi and Gujarati) and were sent to the Gram Panchayats, Legislators, NGOs and Government Officers well in advance;
- Notices prepared in local languages were also posted on the notice boards of Panchayat offices for informing the public at large about the meetings;
- A handout was also prepared by the JST which contained information about the project and important findings of scoping study in English and local languages and distributed to all PAPs and stakeholders during the PCMs; and
- The JST also prepared easy-to-understand presentations in English and other local languages at both stages to provide as much information as possible to the PAPs and other stakeholders.

The invitation letters, handouts and presentation materials used for PCMs for the environmental scoping stage are presented in Attachment II.3.1.

(5) Record of the Meeting

In order to duly incorporate the results into the report, information on each participant, still photographs, audio and video records and detailed minutes of interactive session of each PCM were kept. Comments and suggestions from each participant were also collected through feedback forms. All records related to the PCM were also provided to SEMU of DFCCIL for their own records.

3.2.2 Schedule of PCM for Scoping

The PCMs for scoping were organized in all affected districts in November 2010. After having the 14 PCMs in 14 districts, the necessity of holding additional PCMs in Thane and Raigad Districts were found in order to respond appropriately to the questions from the participants on social issues, especially on land acquisition and compensation. Therefore, it was decided to have additional meetings in Thane and Raigad Districts. At the time, the affected villages in Thane were divided into two areas and had two separate PCMs to make the PCMs more effective, since the DFC Phase 2 alignment passing through Thane

District is much longer than in the other districts. In addition, an additional PCM was held in Faridabad to cover nine additional villages due to new alignment route for Faridabad-Tuglakabad DFC line. Thus, 18 PCMs in total were organized for the scoping stage.

Table 3.1 Information on 18 PCMs for ESIA Scoping Stage

	District	Venue	Date
JNPT-Vadodara Section			
1	Bharuch District	Sevasharam Rajput Chhatralay	Nov. 18, 2010
2	Surat District	Manibhai Marrigat Hall	Nov. 19, 2010
3	Navsari District	Shri Maharaja Agrasen Sanskritik Hall	Nov. 20, 2010
4	Valsad District	Shri Ganesh Hall	Nov. 22, 2010
5	Vadodara District	Kheri Wadi Utpan Samiti Meeting Hall	Nov. 24, 2010
6	Thane District	K.T Wadi Hall	Nov. 25, 2010
7	Thane (Kalyan, Bhiwandi, Vasai): re-holding	Geeta Hall	Feb. 24, 2011
8	Thane (Palghar): re-holding	Lions Club of Palghar	Feb. 28, 2011
9	Raigad District	Asirvad Mangaal Karyalaya	Nov. 25, 2010
10	Raigad: re-holding	Agri Samai Hall	Feb. 25, 2011
Rewari-Dadri Section			
11	Rewari District	Yadav Samaroh Sthal	Nov. 10, 2010
12	Alwar District	Hotel Rajasthan Heritage	Nov. 11, 2010
13	Mewat District	Agarwal Dharamshala	Nov. 13, 2010
14	Palwal District	Abhinandan Banquet Hall	Nov. 16, 2010
15	Faridabad District	Jaat Bhawan	Nov. 18, 2010
16	Faridabad District (9 additional villages)	Primary School, Badshahpur Village, Faridabad Tehsil	Feb. 17, 2011
17	G.B. Nagar District	Sheree Vatika	Nov. 19, 2010
18	Gurgaon District	Punjabi Dharamshala	Nov. 20, 2010

Source: JICA Survey Team

3.2.3 Results of PCM for Scoping

During the discussion in the PCMs, the main issues raised were compensation and employment. Other important issues were displacement and land acquisition, environment, health, drainage, and socio-cultural aspects. These issues were discussed and answered by the railway officials and experts. The results of PCMs for scoping are presented in Attachment II.3.2, while main issues discussed are summarized as follows.

- a) Compensation and employment opportunities
- Discontent on the compensation rate: Compensation proposed to be paid by DFCCIL is 160% of the circle rate (official rate). There was a very high resentment as the compensation rates being paid does not correspond with the actual market rates;
 - Demand for realizing guidelines on providing jobs to one member of every household losing land;
 - Demand on land-for-land and building-for-building was addressed; and
 - Demands for female and young people to have access to equal employment opportunities as well as for individuals to be provided training opportunities to develop their skills;

- b) Displacement and land acquisition
 - Concern on the severe effect resulting from land acquisition: In some cases there may even be loss of homestead land of the people leading to subsequent displacement;
 - Concern on loss of income due to land acquisition and concomitant livelihood impacts;
 - Concern on perceived loss due to the changes in land value along the alignment;
 - Concerns not only on compensation values of land but also for assets on that land – especially trees and wells;
 - Concerns on how to manage the transition between an agricultural livelihood to something else - alternative livelihood or employment options associated with loss of productive land;
 - Location and quality of land replacement: PAPs do not want to be allocated remote land plots as compensation;
 - Devaluation of the agricultural land: Farmers do not want to be left with small useless plots of land; and
 - Displacement of squatters and their treatment.
- c) Environment and Health
 - Concerns on communities affected by loss of ecologically valuable environment, culturally significant sites, and risks to their health (due to increasing noise and air pollution);
 - Concerns on traffic accidents: Pedestrians (particularly children) and domesticated livestock living along the alignment may face risks caused by traffic accidents;
 - Concerns on negative effect on natural habitats and landscapes be it forests, pasture land or specific habitats or landscapes with distinct characteristics: Specifically in Gurgaon, Navsari, Valsad, Thane and Raigad, they have an important cultural or spiritual meaning to communities or offer important resources to the local population, or are of economic importance; and
 - Noise and air pollution impacts: It might call for specific mitigation measures (like noise protection walls or a green belt as proposed by many stakeholders) or even for additional resettlement (moving people out of areas with intolerable noise levels).
- d) Agriculture, Irrigation and Drainage
 - Concerns on the negative impact on cultivated land;
 - Concerns on the negative impact on social communication, petty trade, losing access to irrigation systems etc. where the project might constitute an obstacle to efficient use of or access to resources;
 - Concerns on farmers' productive land being divided in two and how this will be accommodated by the design; and
 - Concerns on relocation of existing water supply pipelines, electrical lines and sewerage lines: There are surface water bodies such as drains and canals joining the river bodies. Therefore, cross-drainage works such as bridges, culverts etc. will be required.
- e) Access to resources and community facilities
 - Concerns on situations in which residential areas may find themselves separated from agricultural fields or other community assets like temples, mosques, cremation grounds, community centers etc., areas which were easily accessible before, or access to certain categories of land (e.g. pastures, sources of firewood or water); and

- Concerns on potential interference with local infrastructure, such as markets, transport, electricity, communication and water, and public services such as medical services and education.
- f) Socio-cultural
 - Concerns on physical impacts on culturally meaningful sites or objects (occupation of land), or by influx of people with a different ethno-cultural background into an area inhabited by a minority population;
 - Demand on constantly updating the status of the project and related social and environmental implications; and
 - Demand on providing public consultation on gender, cultural, social, ecological and above all compensation-related financial issues throughout the project phases.

3.3 PCM FOR DRAFT ESIA

3.3.1 Approach and Methodology PCM for Draft ESIA

The same methodology was adopted for PCMs for draft ESIA. The invitation letters, handouts and presentation materials used for PCMs for draft ESIA stage are presented in Attachment II.3.3.

3.3.2 Schedule of PCM for Draft ESIA

The PCMs for draft ESIA were organized in all affected districts in September 2011. District-wise PCMs were organized one at a time (one venue) per district basically in the 13 affected districts except Thane District. The DFC alignment traverses a large part of Thane District that the PCM was held at two places in Thane. After having the PCMs, necessity of holding additional PCMs in Valsad were found in order to respond appropriately as it had a low participation rate in the previous meeting. Therefore, it was decided to hold another meeting in Valsad.

Table 3.2 Information on 16 PCMs for Draft ESIA Stage

	District	Venue	Date
JNPT-Vadodara Section			
1	Navsari District	Shri Maharaj Agrasen Sanskratik Bhawan	Sep. 9, 2011
2	Valsad District	Shri Ganesh Hall	Sep. 10, 2011
3	Valsad: re-holding	Shri Ganesh Hall	Sep. 26, 2011
4	Surat District	Sri Kutch Kadva Patidar Samaj Bhawan	Sep. 12, 2011
5	Bharuch District	Panchbati Rajput Chhatralaya	Sep. 13, 2011
6	Vadodara District	Khetivadi Utpann Bazar	Sep. 14, 2011
7	Thane (Palgar, Dahanu, Talasari)	Lions Club Community Hall	Sep. 20, 2011
8	Thane (Thane, Kalyan, Bhiwandi, Vasai)	Geeta Hall	Sep. 21, 2011
9	Raigad District	Gokhale Sabhagrih and Mangal Karyalaya	Sep. 22, 2011
Rewari-Dadri Section			
10	Rewari District	Yadav Samaroh Sthal	Sep. 9, 2011
11	Alwar District	Hotel Rajasthan Heritage	Sep. 10, 2011
12	Mewat District	Agarwal Dharamshala	Sep. 12, 2011
13	Palwal District	Abhinandan Banquet Hall	Sep. 14, 2011
14	Faridabad District	Jaat Bhawan	Sep. 15, 2011
15	Gurgaon C	Punjabi Dharamshala	Sep. 16, 2011
16	G.B. Nagar V	Primary School, Gulaoli	Sep. 17, 2011

Source: JICA Survey Team

3.3.3 Results of PCM for Draft ESIA

During the discussions in the PCMs for draft ESIA, people raised many issues apart from the higher compensation rate and employment. Most of these issues were related to clarification on published 20A or 20E Notifications, discrepancy in land records, clarification on width of the ROW, provision of accessible of service roads to farmers, displacement and land acquisition, environment and health, drainage conditions, and socio-cultural aspects. These issues were discussed and answered by the railway officials and Competent Authority. The results of PCMs for draft ESIA are presented in Attachment II.3.4, while the main issues discussed along with suggestions provided by the people are described as follows:

a) Displacement and land acquisition

- Concern on removal of existing overhead electric cable lines in alignment route, underground water pipelines for irrigation, gas pipelines, sewerage lines etc.;
- Concern on loss of income due to land acquisition and concomitant livelihood impacts;
- Concern on perceived loss due to reduced land value along the alignment;
- Concerns not only on compensation of land values but also for assets on that land – especially trees and wells;
- Concerns on how to manage the transition between an agricultural livelihood to something else - alternative livelihood or employment options associated with loss of productive land;
- Devaluation of the agricultural land: Farmers do not want to be left with small useless plots of land; and
- Displacement of squatters and their treatment.

b) Clarification on aspects related to alignment

- Width of land in the ROW to be acquired by the DFC Project;
- Confusion on published 20A or 20E Notifications due to different plot numbers, missing titleholder names, different village names due to alignment change and mismatch with revenue land records;
- Concern on non-availability of alignment drawings for the DFC Project to the PAPs;
- Suggestions on shifting of alignment from main village habitation to at least 200 m or beyond and keeping safe distance from the houses;
- Provision of service roads on both sides of the alignment route and adequate ROBs/RUBs/FOBs to reduce hardships to farmers; and
- Clarification on time period for completion of project and compensation payment to PAPs, district-wise project costs.

c) Compensation and employment opportunities

- Discontent on the compensation rate: Compensation proposed to be paid by DFCCIL is 160% of the circle rate (official rate). There was a very high resentment as the rates being paid as compensation does not correspond with the market rates. Some areas are more developed, have highly fertile land, and have higher quality of other

environmental attributes, so the land valuation is not uniform compared to other areas in the same district,

- Demand for consideration of compensation rate as per the proposed New Land Acquisition Bill which is due to be passed within the next six months. Moreover, long term benefits need to be passed on to the farmers since Railways will continue to have profit for a longer period,
- Demand on acquisition of residual portion of land at the same compensation rate,
- Demand on realizing guidelines on providing jobs to one member of every land losing household. Employment should be given before land acquisition and not after construction of the project,
- Uniform rate for adjoining lands irrespective of whether they fall in different administrative boundaries,
- Demand on land-for-land, building-for-building, compensation for damaged crops (if any) or loss of productivity in nearby fields, and compensation for common lands to be addressed, and
- Demands for female and young people to have access to equal employment opportunities as well as for individuals to be provided training opportunities to develop their skills.

d) Environment and health

- Suggestion on non-use of top fertile soil from the nearby agricultural lands for the DFC Project;
- Suggestion on implementation of afforestation work on both sides of the DFC line using local trees only. Afforestation should be done not only on both sides of railway line but all trees planted should be protected from illegal cutting;
- Concern on deterioration of local water resources in terms of quality and quantity due to the DFC Project. Since many project areas has high groundwater table and surface rivers, no wastewater should enter surface and groundwater sources;
- Concern on creation of unhygienic environment in and around the villages due to poor sanitation and stagnation of water along the rail line;
- Use of fertile agricultural lands for construction of yards or stockpiling of construction materials to be avoided;
- Concerns on communities affected by loss of ecologically valuable environment, culturally significant sites, and risks on their health due to increasing noise and air pollution; and
- Noise and air pollution impacts: It might call for specific mitigation measures (like noise protection walls or a green belt as proposed by many stakeholders) or even for additional resettlement (moving people out of areas with intolerable noise levels).

e) Drainage conditions

- Suggestion of appropriate drainage along the rail line so that land along the alignment does not get affected due to water logging; and
- Concerns on relocation of existing water supply pipelines, electrical lines and sewerage lines: There are surface water bodies such as drains and canals joining the river bodies. Therefore cross-drainage works such as bridges, culverts etc. will be required.

f) Access to resources and community facilities

- Concerns on situations in which residential areas find themselves separated from agriculture fields or other community assets like temples, mosques, cremation grounds, community centers etc., areas which were easily accessible before, or access to certain categories of land (e.g. pastures, sources of firewood or water); and
- Concerns on potential interference with local infrastructure, such as markets, transport, electricity, communication and water, and public services such as medical services and education.

g) Socio-cultural

- Concerns on physical impacts on culturally meaningful sites or objects (occupation of land), or by influx of people with a different ethno-cultural background into an area inhabited by a minority population;
- Demand on constantly updating the status of the project and related social and environmental implications; and
- Demand on providing public consultation on gender, cultural, social, ecological subjects and above all compensation-related financial issues throughout the project phases.

3.4 LESSONS LEARNED FROM PCM

During the PCMs at scoping stage and draft ESIA stage, various issues were raised by the participants and answered by the railway and state government officials. Achievements made and various lessons learned for future public consultation are elaborated as follows:

- PCM truly gives an opportunity to all PAPs to interact directly with the government officials in a more transparent and open environment. In normal situations, affected people do not know even the basic parameters of the Project and usually develop wrong notions about the Project;
- Traditional knowledge and need comes directly from the affected population, which can be used for rehabilitation;
- Most concerns raised in the PCMs across the 14 districts generally revolved around adequate compensation and provision of jobs in spite of the PCM being rather intended to discuss on environment and social issues and impacts;
- Although PCM for projects where land acquisition is a sensitive issue are normally carried out under stressful environments, they still give an opportunity to PAPs for convey their common agenda and concerns to the relevant authority for appropriate action. Without interacting directly with the affected people on a common forum, it is not only difficult to gauge area-specific issues but also difficult to distinguish between genuine and non-genuine demands of the people;
- Before starting any new PCM, minutes of previous meetings along with the actions taken should be presented before the participants as it actually builds confidence among the people towards the Project. People normally expect and want to know if whatever they had mentioned in previous meetings were taken into consideration or not;
- People expect more frequent communications with project managers for clarifying their doubts at the individual level;

- Sometimes the meetings are dominated by individuals/interest groups, limiting opportunities for other weaker groups or PAPs to participate actively;
- The PCM is not an end. The public must be given access to information which must be updated regularly and made accessible to them in an easy to understand format. Information centers or grievance redress mechanism avenues must be provided on a continual basis even after winding up the PCM proceedings.

CHAPTER 4 ASSISTANCE FOR INFORMATION DISSEMINATION REGARDING ESIA

4.1 INTRODUCTION

The ESIA study findings are disseminated to the PAPs, stakeholders and the implementation authorities so that preventive measures can be taken for the successful completion of the Project. The objectives of information dissemination are as follows:

- 1) Disseminate information on findings of the study on environmental and social considerations of the DFC Project, including environmental and social impacts, mitigation measures, and general plan on the management and monitoring of the environment in the study area;
- 2) Collection of comments and opinions from the public on environmental and social issues on the DFC Project at draft ESIA report stage and reflect them in the final ESIA report.

In order to meet the requirements as well as to achieve aforesaid objectives, the JST has assisted to implement information dissemination in two stages for the ESIA:

- The first stage of information dissemination was conducted when the draft ESIA was prepared. The full draft ESIA report (main report and appendices) in English was delivered and placed at DFCCIL head office and respective CPM offices, major existing railway stations and District Magistrate offices along the proposed DFC alignment. Additionally, the summary of the draft ESIA was prepared in local languages (Hindi, Gujarati and Marathi) and was delivered to the Sarpanches (village head) of all the project-affected villages along the DFC alignment as well as the Competent Authorities in the State of Maharashtra;
- The second stage of information dissemination was implemented at the final ESIA stage. The final ESIA report (main report and appendices) in English was delivered and placed at the same places as in the first stage. Additionally, the summary of the final ESIA was also prepared in local languages (Hindi, Gujarati and Marathi) and was delivered to all the project-affected villages and offices of the Competent Authorities in a similar manner as in the first stage.

The JST arranged the process of information dissemination in a systematic, timely and transparent manner with the help of the local consultant thereby ensuring widest possible public participation in the Project.

4.2 INFORMATION DISSEMINATION OF DRAFT ESIA REPORT

4.2.1 Distribution of Draft ESIA Report

The draft ESIA main report and summary were distributed by the JST in Sept 2011. The approach and methodology followed for the process in draft ESIA report stage are as follows:

- The summary of the draft ESIA in English and other local languages were prepared and forwarded to DFCCIL head office as well as to respective CPM offices for review and approval. Upon approval, the required number of copies was printed (see Attachment II.4.1);

- The draft ESIA reports including the summary in English and vernacular languages (Hindi, Gujarati and Marathi) was distributed as shown in Table 4.1;
- Draft ESIA report was distributed to the DFCCIL Head office, four CPM offices of DFCCIL, the 14 District Collector (DC) offices and the 17 Major Stations including Junction Stations along the proposed DFC alignment. Full reports (Main and Appendices) were available there for public review;
- Summary of the draft ESIA reports were distributed to Sarpanches of 374 project-affected villages, four CPM offices, 14 DC offices, and 17 Major Stations including Junction Stations along the proposed DFC alignment. Upon the request of CPM Mumbai office, copies of summaries in English and Marathi were also distributed to the Competent Authority of Raigad and Thane Districts, the Chairman of JNPT in Mumbai, and the CIDCO office in Raigad;
- In order to facilitate proper information dissemination of the availability of draft ESIA report as well as summary and call for comments, public notices in vernacular languages (Hindi, Gujarati and Marathi) were put up on notice boards of Sarpanch offices of respective villages. Letters in vernacular languages were also given to individual Sarpanch. Letters in English language were given to DC and Station Masters of all Major Stations along with the reports and summaries (see Attachment II.4.2);
- Additionally, proper announcement of availability of draft ESIA report and submission of comments were made in all PCM meetings at draft ESIA report stage which were conducted from September 9 to 26, 2011;
- No PAP or other stakeholders refused to accept the draft ESIA reports and its summary;
- Last date for receiving comments was initially set September 26, 2011 but since some distribution was made a little late after a request from CPM Mumbai office, the submission date was later extended to October 9, 2011, giving 10 days for public review;
- Comments and opinions were accepted on draft ESIA report only in writing through direct delivery, fax, or post either directly to DFCCIL Head office, respective CPM offices or to the JST. A dedicated email (dfc.phase2@gmail.com) was also provided which was periodically monitored by the JST during the disclosure period;
- On termination of disclosure period, the JST requested DFCCIL to ask all respective CPM offices to forward all comments, if any, received from PAPs or any other stakeholders;
- After compilation of all comments received either through CPM offices or directly, the JST reviewed and analysed all comments and appropriately incorporated them in the Final ESIA report.

Table 4.1 Distribution List of Draft ESIA Report

Distribution Place			Main report	Summary				
				Total	English	Marathi	Gujarati	Hindi
DFCCIL 1 Corporate Office and 4 CPM/AGM Offices	1	Corporate Office	3	20	5	5	5	5
	2	CPM-Mumbai	3	20	5	15		
	3	CPM-Surat	3	20	5		15	
	4	CPM-Vadodara	3	20	5		15	
	5	AGM-Rewari-Dadri	3	20	5			15
	Sub Total			15	100	25	20	35
Main Station Total: 17 Main Stations	1	Panvel(Jn)	1	20	5	15		
	2	Kalyan(Jn)	1	20	5	15		
	3	Vaitarna	1	20	5	15		
	4	Kelve Road	1	20	5	15		
	5	Palghar	1	20	5	15		
	6	Dahanu Road	1	20	5	15		
	7	Sanjan	1	20	5		15	
	8	Vapi	1	20	5		15	
	9	Valsad	1	20	5		15	
	10	Billimora(Jn)	1	20	5		15	
	11	Navsari	1	20	5		15	
	12	Sachin	1	20	5		15	
	13	Kosamba(Jn)	1	20	5		15	
	14	Saniali	1	20	5		15	
	15	Rewari(Jn)	1	20	5			15
	16	Faridabad	1	20	5			15
	17	Dadri	1	20	5			15
Sub Total			17	340	85	90	120	45
District Total: 14 Districts	1	Raigad	1	15	5	10		
	2	Thane	1	15	5	10		
	3	Valsad	1	15	5		10	
	4	Navsari	1	15	5		10	
	5	Surat	1	15	5		10	
	6	Bharuch	1	15	5		10	
	7	Vadodara	1	15	5		10	
	8	Rewari	1	15	5			10
	9	Alwar	1	15	5			10
	10	Mewat	1	15	5			10
	11	Gurgaon	1	15	5			10
	12	Palwal	1	15	5			10
	13	Faridabad	1	15	5			10
	14	Gautam Buddh Nagar	1	15	5			10
Sub Total			14	210	70	20	50	70
Affected Village* Total: 374 villages	136 villages in Maharashtra			3,400	680	2,720		
	133 villages in Gujarat			3,325	665		2,660	
	105 villages in Haryana, Rajasthan, UP			2,625	525			2,100
CIDCO, JNPT and CA of Thane and Raigad	Maharashtra			40	20	20		
	Sub Total				9,390	1,890	2,740	2,660
At JST office			4					
Total			50	10,055	2,085	2,870	2,865	2,235

Note: * 25 sets of the Summary distributed to each village: 5 in English and 20 in local language.

See Attachment II.4.3 for more detail distribution status.

Source: JICA Survey Team

4.2.2 Collected Comments

All comments and opinions were received through email only and none of the CPM offices received any comments or opinions.

(1) Number of Collected Comments

A total five (four readable and one unreadable) comments were received (see Attachment II.4.4). District wise numbers of comments are given in Table 4.2.

Table 4.2 District-wise Number of Comments Received Regarding Draft ESIA Report

State	District	No. of Comments Received *
Haryana	Palwal	2
	Faridabad	1
	Gurgaon	1
	Sub-Total	4**
Rajasthan	Alwar	Nil
U. P.	G. B. Nagar	Nil
Gujarat	Vadodara, Bharuch, Surat, Navsari and Valsad	Nil
Maharashtra	Thane and Raigad	Nil
Grand Total		4

Note: Other than this, five letters were given directly to the JST members during PCM meetings at draft ESIA stage and two letters came by post directly to the JST. These are not considered as comments on draft ESIA report. However, original and scanned copies of all these letters were sent to DFCCIL Head office and respective CPM offices.

*As of 09th October 2011

** One additional comment received but it was unreadable. The sender was immediately informed through return email but no response came.

Source: JICA Survey Team

(2) Classification of Comments

After scrutinizing these four comments, these were classified under the following categories Natural Environment, Pollution, Sensitive Receptor, Land Compensation, Compensation for utilities, Employment and others. Summary table of comments is shown in Table 4.3.

Table 4.3 Classification of Comments regarding Draft ESIA

State	District	No. of Comments Received	Type of Party	Classification of Comments						
				Natural Environment	Pollution	Sensitive Receptor	Land Compensation	Compensation for utilities	Employment	Others
Haryana	Palwal	2	Individual (2)	1	1	0	7	3	4	2
	Faridabad*	1	Jointly signed by Village Sarpanch (3), Businessman (1) and Numberdar (1)	0	0	0	2	2	1	3
	Gurgaon*	1	Jointly signed by Village Sarpanch (1), Businessman (1) and Numberdar (1)	0	0	0	2	2	1	3
Grand Total		4		1	1	0	11	7	6	8

Note: As of data available on October 9, 2011

*Comments received from Faridabad and Gurgaon were identical.

Source: JICA Survey Team

4.2.3 Conclusion

Among these comments, only two comments pertaining to reduction of dust pollution during construction to avoid damage to crops in nearby fields and minimizing impacts on existing drainage channels were incorporated in the final ESIA report. These comments will be taken care of during the implementation period through mitigation measures and EMP.

Besides these, there are mainly comments related to higher compensation for land and utilities, employment, and other rehabilitation and resettlement issues. These specific issues are being dealt with separately in the RRP report.

4.3 INFORMATION DISSEMINATION OF FINAL ESIA REPORT

The information dissemination of the final ESIA Report was started in February 2012.

The approach and methodology followed for the process in the final ESIA report stage is as follows:

- The summaries of the final ESIA in English and other local languages were prepared after incorporating all necessary changes in the draft ESIA summary. These were again forwarded to DFCCIL head office as well as to the respective CPM offices for review and approval. Upon approval, the required number of copies was printed;
- The distribution of final ESIA reports including summary in English and vernacular languages (Hindi, Gujarati and Marathi) were similar to the one shown in Table 4.1;
- Final ESIA Report was distributed to DFCCIL Head office, four CPM offices, 14 DC offices and 17 major stations including Junction Stations along the proposed DFC alignment as shown in Table 4.4;
- Summary of the draft ESIA reports were distributed to Sarpanches of project affected villages, four CPM offices, 14 DC offices, and 17 Major Stations including Junction Stations along the proposed DFC alignment. Additionally, copies of summaries in English and Marathi were also distributed to the Competent Authority of Raigad and Thane Districts, the Chairman of JNPT in Mumbai, and the CIDCO office in Raigad;
- In order to facilitate proper information dissemination of availability of final ESIA reports as well as the summary, public notices in vernacular languages (Hindi, Gujarati and Marathi) were put up on notice boards of Sarpanch offices of respective villages. Letters in vernacular languages were also given to individual Sarpanch. Letters in English language were given to DC and station masters of all major stations along with the reports and summaries (see Attachment II.4.6);
- It was mentioned in letters and public notices that these distributed reports would serve as a future reference for this project and reports were available at various places for public viewing;
- The draft ESIA reports which were placed in many places in September 2011 were collected, wherever available, and replaced with the final ESIA report.

As of 7 March 2012, two villages⁴ in Faridabad District have been refused to receive the Final ESIA summary due to refusal of the land acquisition under the Project. As soon as the issue is solved, the Final ESIA summary should distribute those villages.

⁴ Fatehpur Billoch and Prahladpur Villages

Table 4.4 Distribution List of Final ESIA Report

Distribution Place			(A) Main report	(B) Summary				
				Total	English	Marathi	Gujarati	Hindi
DFCCIL 1 Corporate Office & 4 CPM/AGM Office	1	Corporate Office	4	20	5	5	5	5
	2	CPM-Mumbai	4	25	5	20		
	3	CPM-Surat	4	25	5		20	
	4	CPM-Vadodara	4	25	5		20	
	5	AGM-Rewari-Dadri	4	25	5			20
Sub Total			20	120	25	25	45	25
Main Station Total: 17 Main Stations	1	Panvel(Jn)	1	10	5	5		
	2	Kalyan(Jn)	1	10	5	5		
	3	Vaitrna	1	10	5	5		
	4	Kelve Road	1	10	5	5		
	5	Palghar	1	10	5	5		
	6	Dahanu Road	1	10	5	5		
	7	Sanjan	1	10	5		5	
	8	Vapi	1	10	5		5	
	9	Valsad	1	10	5		5	
	10	Billmora(Jn)	1	10	5		5	
	11	Navsari	1	10	5		5	
	12	Sachin	1	10	5		5	
	13	Kosamba(Jn)	1	10	5		5	
	14	Saniali	1	10	5		5	
	15	Rewari(Jn)	1	10	5			5
	16	Faridabad	1	10	5			5
	17	Dadri	1	10	5			5
Sub Total			17	170	85	30	40	15
District Total: 14 Districts	1	Raigad	1	20	5	15		
	2	Thane	1	20	5	15		
	3	Valsad	1	20	5		15	
	4	Navasari	1	20	5		15	
	5	Surat	1	20	5		15	
	6	Bharuch	1	20	5		15	
	7	Vadodara	1	20	5		15	
	8	Rewari	1	20	5			15
	9	Alwar	1	20	5			15
	10	Mewat	1	20	5			15
	11	Gurgaon	1	20	5			15
	12	Palwal	1	20	5			15
	13	Faridabad	1	20	5			15
	14	Gautam Budha Nagar	1	20	5			15
Sub Total			14	280	70	30	75	105
Competent Authorities Total: 2 Districts	1	Raigad		20	5	15		
	2	Thane		20	5	15		
Sub Total			0	40	10	30	0	0
Others (JNPT & CIDCO) Total: 2	1	JNPT, Raigad		20	5	15		
	2	CIDCO, Raigad		20	5	15		
Sub Total			0	40	10	30	0	0
Affected Village* Total: 374 villages	136 villages in Maharashtra			3,400	680	2,720		
	133 villages in Gujarat			3,325	665		2,660	
	105 villages in Haryana, Rajasthan, UP			2,625	525			2,100
Sub Total				9,350	1,870	2,720	2,660	2,100
At JST office			4	100	25	25	25	25
Total			55	10,100	2,095	2,890	2,845	2,270

Note: * 25 sets of the Summary distributed to each village: 5 in English and 20 in local language.

See Attachment II.4.7 for more detail distribution status.

Source: JICA Survey Team

CHAPTER 5 DRAFT ENVIRONMENTAL CHECKLIST AND MONITORING FORM

5.1 DRAFT ENVIRONMENTAL CHECKLIST

During the Preparatory Survey, various environmental and social considerations were examined through the ESIA and RRP studies and incorporated into the plan and design of the Project. The key points obtained in the course of environmental and social considerations studies as of the Preparatory Survey stage for Phase 2 has been summarized by using a format of the Environmental Checklists, No. 8 for Railways, defined in the JICA Guidelines for Confirmation of Environmental and Social Considerations (April, 2010). The draft Environmental Checklist is shown in Table 5.1.

Table 5.1 Draft Environmental Checklist of JICA Guidelines

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in official process?	Y	(a) According to Indian law, railway and bridge construction projects do not require an EIA study and do not need to obtain Environmental Clearance (EC). However, the ESIA report has already been prepared.
		(b) Have EIA reports been approved by authorities of the host country's government?	Y	(b) There is no opinion from the government, when the Final ESIA report was approved by MOR and DFCCIL.
		(c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied?	N	(c) There is no condition for approval of the Final ESIA report.
		(d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	Y	(d) It is required to obtain i) the clearance under the Forest (Conservation) Act, 1980 (FCA) from the forest department before starting any activity within the Forest area and ii) the clearance under the Wildlife (Protection) Act, 1972.(WPA). DFCCIL has already submitter proposal for obtaining clearance under FCA and WPA.
	(2) Explanation to the Local stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the Local stakeholders based on appropriate procedures, including information disclosure? Is understanding obtained from the Local stakeholders?	Y /N	(a) Brief description of the project and the potential impacts were explained to the local stakeholders through PCMs which were conducted district-wise in 14 districts. The first stage meeting was conducted in November 2010 (and supplemental meeting in Maharashtra in February 2011) at the scoping stage. The second stage meeting was conducted in September 2011 at the draft ESIA stage. The PCMs were attended by PAPs, representatives from gram sabha and gram panchayat, elected members of zila parishad, district administration, revenue department, forest officers, local important persons (MPs, MLAs), and other local people.
		(b) Have the comment from the stakeholders (such as local residents) been reflected to the project design?	Y	(b) Various opinions and suggestions were exchanged at the PCM. Comments raised at the PCM were integrated in the Final ESIA reports as well as project design accordingly. Major comments and reflection of those comments into the Project are the matter of resettlement and compensation. These specific issues will be dealt separately in RRP report.
	(3) Examination of Alternatives	(a) Have alternative plans of the project been examined with social and environmental considerations?	Y	(a) As for route selection, environmental and social aspects such as land acquisition and resettlement have been examined as well as technical and economic aspects. It is shown in the Final ESIA report.
2 Pollution Control	(1) Water Quality	(a) Is there a possibility that soil runoff from the bare lands resulting from earthmoving activities, such as cutting and filling will cause water quality degradation in downstream water areas?	Y	(a) Soil erosion and sedimentation could be minimized by constructing breast walls, retaining walls, pilot bioengineering methods, dykes, sedimentation chambers, basins, fibre mats, mulches, grasses, slope, drains and other devices. After completion of embankment building, the embankment will be turfed for slope stabilization purposes. Cascading drainage system will be provided for controlling of the erosion from the embankments.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		(b) Do effluents from the project facilities, such as stations, comply with the country's effluent standards and ambient water quality standards? Is there a possibility that the effluents will cause areas not to comply with the country's ambient water quality standards?	Y/N	(b) There are no facilities to generate effluents, since the project is freight train service, not a traveler service. In addition there is no planning regarding the new depot for the Phase2 section.
	(2) Wastes	(a) Are wastes generated from the project facilities, such as stations and depot, properly treated and disposed of in accordance with the country's regulations?	Y	(a) There are no remarkable wastes generated from the project facilities, such as stations.
	(3) Noise and Vibration	(a) Do noise and vibrations from the vehicle and train traffic comply with the country's standards?	Y/N	(a) There is no standard regulation on railway noise and vibration in India, which can be referred as the criteria. Regarding the railway noise, "Guideline for noise regarding new construction / major changes of railway lines in Japan" was adopted. As a result, for most of the prediction location for the parallel section and part of the detour section, the predicted values didn't meet the guideline values (daytime: 60 dB(A), nighttime: 55 dB(A)). In fact, the result also indicates that railway noise levels from the existing railway track already exceed the guideline value for half of the sites at nighttime. Therefore, environmental impact due to railway noise was considered to be significant. Therefore, some mitigation measures are recommended to be taken especially along the residential areas and near the sensitive receptors. As for vibration, "Guideline Value of Vibration from Shinkansen Super Express Railway in Japan" was also adopted. In all of the prediction locations, predicted values meet the guideline value (70 dB). Therefore, environmental impact of railway vibration was considered to be light.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
2 Pollution Control	(4) Subsidence	(a) In the case of extraction of a large volume of groundwater, is there a possibility that the extraction of groundwater will cause subsidence? (especially in case of Undergrounds/Subways)	Y	<p>(a) Associated with the tunnel construction at the Vasai Detour, hydrological conditions in the watershed area are likely to be affected by groundwater shifting. Since the planned railway formation level on the Mumbai side is higher than it is at the Delhi side groundwater levels are likely to be affected. Due to the alteration of groundwater flow, present flow to out-flow from the tunnel after construction, the water quality of groundwater is likely to be affected especially dissolved metal contents such as iron (Fe) in the water. The formation level in the tunnel section will be considered by DFCCIL to minimize the impact on the hydrological conditions in each watershed resulting from seepage on both sides of the tunnel.</p> <p>Hydrological analysis in the area covering at least 500 m from the tunnel is required and will be conducted by DFCCIL prior to the design. Correlation between rainfall and groundwater level (water discharge from the area) will be adequately analyzed based on monitoring over a longer period to clearly assess the impact. Geological structure investigation through field reconnaissance of surface conditions and aerial photo analysis will be conducted prior to implementation. Water recharge to the local community will be considered to replace the groundwater used during construction. The water will be adequately treated and of the same or better quality as at present based on the water quality analysis which will be conducted prior to implementation.</p>
3 Natural Environment	(1) Protected Areas	(a) Is the project site located in protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	N	<p>(a) For SGNP in Thane District of Maharashtra, the proposed DFC alignment passes through the reserved forest area outside the range boundary of the Protected Area. There is an existing rail way line. The proposed DFC alignment is designed parallel to the existing line and already developed area.</p> <p>However, During the XXI meeting of the Indian Board for Wildlife held on January 21, 2002, a "Wildlife Conservation Strategy-2002" was adopted wherein Point No.9 envisaged that "lands falling within 10 km of the boundaries of National Parks and Sanctuaries should be notified as eco-fragile zones under section 3(v) of the Environment (Protection) Act and Rule 5 Sub rule (viii) and (x) of the Environment (Protection) Rules."</p> <p>For the SGNP, the provision of above mentioned criteria resulted in the requirement of a clearance for the DFC Project. As a result, DFCCIL has already submitted a proposal for obtaining clearance under WPA.</p>

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
3 Natural Environment	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)?	N	(a) The tree census was conducted within the ROW of the alignment. The result is shown below; <u>JNPT- Vadodara Section</u> Approximately 45,000 trees will be required to be removed from the corridor. Even though there is no mangrove vegetation in the proposed DFC alignment, in Thane District, DFC route will affect some mangrove areas which are deemed as notified reserved forests since the Project area is in a designated coastal area. <u>Rewari-Dadri Section</u> Approximately 3,100 trees will be required to be removed from the corridor. The corridor will bisect the Gulistanpur Reserved Forest. The Gulistanpur Reserved Forest is located close to the industrial area of Surajpur and is not a natural forest but a result of plantation work by the forest department.
		(b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions?	Y	(b) The two season studies in the forest village area in JNPT-Vadodara Section falling under the proposed corridor revealed the presence of the following endangered plant species: <i>Sterculia urens</i> , and the Red data listed <i>Terminalia arjuna</i> , and plants of Ethno-botanic importance <i>Anona squamosa</i> and <i>Dioscorea bulbifera</i> .
		(c) If significant ecological impacts are anticipated, are adequate protection measures taken to reduce the impacts on the ecosystem?	Y	(c) Review design and make adjustments to ROW or alignment route to the extent feasible to reduce loss of Recorded Forest Lands to the minimum as well as to keep safe distance from the protected boundary of the notified forest areas.
		(d) Are adequate protection measures taken to prevent impacts, such as disruption of migration routes, habitat fragmentation, and traffic accident of wildlife and livestock?	Y	(d) The following proposed mitigation measures shall be conducted; -Fencing and development of safe passages for wildlife and local residents. -Detailed study of the SGNP to ascertain the future development aspects only, so that plans can be prepared in a timely fashion to avoid habitat loss and minimise stress. -The proposed corridor is likely to affect the Gulishtanpur Reserved Forest Areas as the alignment route bisects the forest area. Therefore, immediate action should be taken to compensate by new plantation in the open scrub area adjacent to the reserve so that loss of habitat can be minimized.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
3 Natural Environment	(2) Ecosystem	(e) Is there a possibility that installation of rail roads will have impacts, such as destruction of forest, poaching, desertification, reduction of wetland areas, and disturbance of ecosystems due to introduction of exotic (non-native invasive) species and pests? Are adequate measures for preventing such impacts considered?	Y	(e) There is a possibility that installation of railroads may cause impacts such as destruction of forest which are the same as (a). Review design and assess alternatives where feasible to reduce loss of forest land. Appropriate compensatory plantation should be initiated to compensate for the vegetation loss due to felling of trees for site clearing. For trees to be cut, sufficient compensatory plantation should represent approximately two times the number of trees felled. For trees to be felled in private land, compensation for land and trees will be given to the owners. The rate of compensation for trees lost will be decided by the State Forest Department.
		(f) In cases where the project site is located at undeveloped areas, is there a possibility that the new development will result in extensive loss of natural environments?	Y	(f) Agriculture is the main land use in the Rewari-Dadri section as well as JNPT- Vadodara section. In the Diva-Vasari section, the alignment of the proposed corridor has been planned parallel to the existing central railway track. However, there is a possibility of the new development such as destruction of forest area, details are the same as (a).
	(3) Hydrology	(a) Is there a possibility that alteration of topographic features and installation of structures, such as tunnels will adversely affect surface water and groundwater flows?	Y	(g) The tunnel is planned in Vasai Taluka of Thane District in Maharashtra State. The length of the tunnel is 540 m. The area between the two hills for closed tunnel and open cut is the major ground water flow recharging zone from the catchment and feeds the downstream wells. It is recommended that the corridor between the two hills should be elevated so that the existing groundwater flow would not be altered. Alteration of the same may result in the reduction of discharge of the wells downstream of the tunnel section.
	(4) Topography and Geology	(a) Is there a soft ground on the route that may cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides, where needed?	N	(a) The DFC alignment which passes through plain, rolling and hilly terrain could impact the overall relief of the region. The possibility of weak zones such as faults, joints, shear zones could enhance the rock-joint rupture hazard during deep cutting and rock excavation work in Aravalli hills in Taoru block of Mewat District. The geological history of basaltic rock formation in hill block of Vasai detour where the closed tunnel is to be built, indicate enhancement of rock-joint rupture hazard during rock excavation work. Disfiguring of topography due to indiscriminate digging of borrow pits. Disturbance of geological setting of mountainous metal quarry site in Kundevahal detour due to DFC Project activities. Mitigation measures will be prepared below; The necessary details should be studied for rock-rupture hazards and bed rock geology along with characterization of weak zones in both Aravalli hills and Vasai detour before construction work. Only identified borrow pits and quarry sites should be used to avoid any disfiguring of topography. Construction materials should be procured from approved and licensed quarry sites only.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
3 Natural Environment	(4) Topography and Geology	(b) Is there a possibility that civil works, such as cutting and filling will cause slope failures or landslides? Are adequate measures considered to prevent slope failures or landslides?	Y	(b) Loosening of top soil and loss of vegetative cover from the ROW along the detour and parallel section due to excavation, land cut and back filling could lead to soil erosion. Mitigation measures will be prepared such as avoiding cut and fill operation in the monsoon season. Embankment slopes made from earthen material as well as exposed surfaces of hills should be protected using low cost bio-engineering products for preventing soil erosion in areas which have high soil erodability or high intensity rainfall.
		(c) Is there a possibility that soil runoff will result from cut and fill areas, waste soil disposal sites, and borrow sites? Are adequate measures taken to prevent soil runoff?	Y	(c) During construction of embankment, loose soil for embankment preparation could result in silt run-off if exposed to wind or rain and appropriate compaction or stabilization measures are not adopted immediately. Adequate temporary or permanent drainage should be provided before slope construction begins to allow silt to settle out.
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If involuntary resettlement is caused, are efforts made to minimize the impacts caused by the resettlement?	Y	(a) It is expected that a number of households (people), shops and street stalls will be relocated due to the Project implementation. Necessary efforts to minimize the impacts due to resettlement have been made in the Project design, in the alternative analysis of the route at the detour line. Moreover, in order to minimize the magnitude of resettlement, the DFC is planned to be constructed along the existing rail way area wherever possible.
		(b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement?	Y	(b) Thirty-five PCMs and one village meeting for draft RRP were held between November 14 and 26, 2011 in the four CPM jurisdictions.
		(c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement?	Y	(c) RRP policy framework has been prepared as part of the RRP report based on results of the Baseline Survey and Census conducted during the Preparatory Study. Land and structures will be compensated at full replacement cost. Non-owners such as tenants and employees will be provided cash or other kinds of assistance to restore their livelihoods and living standards.
		(d) Are the compensations going to be paid prior to the resettlement?	Y	(d) Compensation will be paid before resettlement.
		(e) Are the compensation policies prepared in document, and in case the scale of resettlement is large, has the resettlement plan been disclosed?	Y	(e) The draft RRP report, in which compensation policies are described, was disclosed at all project affected villages and other relevant facilities/organizations. The RRP report will be finalized incorporating the result of Baseline Survey and Census at the remaining four villages in Faridabad District, and then it will be disclosed.
4 Social Environment	(1) Resettlement	(f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples?	Y	(f) Socially vulnerable groups such as poor , indigenous and ethnic people may be affected. Equitable opportunities for ethnic and vulnerable groups to participate in consultation processes and receive compensation or benefits. This may require printing of materials in different language or use of interpreters.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		(g) Are agreements with the affected people obtained prior to resettlement?	Y/N	(g) Thirty-five PCMs and one village meeting for RRP were held between the November 14 and 26, 2011 in the four CPM jurisdictions. But, there are four villages which refused the Baseline Survey and Census, as of the end of February, 2012.
		(h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?	Y	(h) An organizational framework of RRP, in which compensation policies are described, is under preparation, as of the end of February, 2012.
		(i) Are any plans developed to monitor the impacts of resettlement?	Y	(i) Monitoring is planned to be implemented in terms of progress of resettlement, implementation of assistance, etc.
		(j) Is the grievance redress mechanism established?	Y	(j) General contact window of the entire project period is DFCCIL. In addition, each governorate is also contact window of grievance redress according to the Indian regulations. DFCCIL will contact the relevant governorate if grievance needs to be handled according to the Indian regulation. If grievance is related to compensation under DFCCIL responsibility, it will be settled by DFCCIL.
	(2) Living and Livelihood	(a) Where railways are newly installed, is there a possibility that the project will affect the existing means of transportation and the associated workers? Is there a possibility that the project will cause significant impacts, such as extensive alteration of existing land uses, changes in sources of livelihood, or unemployment? Are adequate measures considered for preventing these impacts?	Y	(a) Local economy such as employment and livelihood will be affected due to land acquisition and involuntary resettlement. Negative impacts on the local economy could be mitigated through the certainty of new employment or livelihood opportunities related to the railway e.g. jobs for priority PAPs as station staff, construction workers. Proper compensation and livelihood assistance shall be provided as per the compensation policy to be established in the RRP.
4 Social Environment	(2) Living and Livelihood	(b) Is there any possibility that the project will adversely affect the living conditions of inhabitants other than the affected inhabitants? Are adequate measures considered to reduce the impacts, if necessary?	Y	(b) PAPs feel that their interests are not being adequately taken care of by the state government/DFCCIL. Efforts are made to incorporate local/PAP interests into the design, construction and operation phases. Requires careful facilitation and effective participation may require translation/interpretation for fair representation. Also make clear compensatory benefits and what PAPs are entitled to and how to get it.
		(c) Is there any possibility that diseases, including infectious diseases such as HIV, will be brought due to influx of workers associated with the project? Are adequate considerations given to public health, if necessary?	Y	(c) In the case where contractor(s) workers' camps are established, the health care system including prevention of communicable diseases will be planned based on the recommendations of ESIA such as preventing diseases, providing first aid treatment for onsite injuries and providing healthcare services to the workforce. Mass awareness campaigns and distribution of condoms should be planned.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		(d) Is there any possibility that the project will adversely affect road traffic in the surrounding areas (e.g., by causing increases in traffic congestion and traffic accidents)?	N	(d) There is no possibility of blocking the traffic flow by attracting unplanned and informal public transportation such as minibuses and taxis in large numbers near the new stations because the DFC Project is a Freight Corridor.
		(e) Is there any possibility that railways will impede the movement of inhabitants?	Y	(e) Affected communities would be distributed in terms of regional severance by construction work and new freight trucks and other related facilities. Accesses to and connection with the community shall be secured by providing the alternative passage.
		(f) Is there any possibility that structures associated with railways (such as bridges) will cause a sun shading and radio interference?	N	(f) In case of parallel section, vertical alignment of DFC may be designed in the same level as the existing railway/ground level to reduce the modification as well as considering the technical and operational limitation. Therefore it's predicted that there will be no big changes from the current situation. In case of detour section, the proposed alignment was designed to avoid the residential areas. The embankment may be designed such that the slope does not exceed 1:2 (vertical to horizontal). The shade of DFC structure might be limited in the ROW, when Indian sun altitude is considered. Therefore it is predicted that there are no negative impacts to the residential area along the proposed line.
4 Social Environment	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	N	(a) The Project is designed to avoid existing archaeological properties. If construction work is carried out in the limits of prohibited area (within 100 meters) or regulated area (100-200 meters) of any designated heritage or archaeological sites and remains, permission should be obtained from the relevant authorities. The status of such structures should be checked with the archaeological department. No building or structure of historical importance which has been in existence for more than 75 years should be demolished without informing the relevant authorities.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken?	Y	(a) There is a possibility that the construction of a railway embankment is likely to cause aesthetic changes to the landscape. Suitable landscaping and plantation activities, and slope protection activities are envisaged to minimize the aesthetic impacts.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples?	N	(a) There is a possibility of impact on ethnic minorities and indigenous peoples, such as Scheduled Tribe. Considerations are same as 4.(1).(a) and (f).
		(b) Are all of the rights of ethnic minorities and indigenous people in relation to land and resources respected?	N/A	(b) All of the rights of ethnic minorities and indigenous peoples in relation to land and resources will be respected by Entitlement Matrix for the DFC Project based on "Railways (Amendment) Act, 2008" and "National Rehabilitation and Resettlement Policy, 2007", and details are mentioned in RRP.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances associated with the working conditions of the country which the project proponent should observe in the project?	N	(a) The Project proponent will fulfill the requirements to protect working conditions according to The Labors Act of 1988.
		(b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment which prevents industrial accidents, and management of hazardous materials?	Y	(b) safety considerations to prevent the injuries and accidents to individuals, such as first-aid kit, Personal Protective Equipment (PPE) , secure tamper-proof fence, security lighting, regular security patrols , etc.
4 Social Environment	(6) Working Conditions	(c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of a safety and health program, and safety training (including traffic safety and public health) for workers etc.?	N	(c) There are no established safety and health program, and safety training specially. Adequate measures will be planned by constructors during the construction as described below. -Ensure that first aid kits are available in all work areas, supplied with adequate material to treat common workplace injuries; -Training of all construction workers in basic sanitation and healthcare issues, general health and safety matters, and on the specific hazards of their work; -Dedicated transport should be provided at all work sites to take injured persons to hospitals if needed. Record of all nearest hospitals and health centers should be kept at each construction site; -A regular medical facility should be provided at each camp with suitable qualified staff and equipment to treat minor ailments and injuries; -An effective alarm system should be established to warn track workers of approach of trains on existing IR lines in parallel route alignment; -Protect all electric sub-stations, high tension towers and other areas from electrocution risk by providing security fencing and lights, warning signs and security patrols.
		(d) Are appropriate measures taken to ensure that security guards involved in the project will not violate safety of other individuals involved, or local residents?	Y	(d) Traffic police for the railways will be arranged appropriately.

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)?	Y	(a) Adequate measures will be planned and provided to mitigate the negative impacts of environmental pollution during construction stage as described below. <u>Noise and vibration</u> : planning the deliberate and efficient equipment use, use of the low pollution-type machine, regular maintenance of construction machines. <u>Turbid water</u> : Silt fencing may be provided near water bodies. All the construction and preparatory activities including construction of culverts and bridges would be carried out during dry seasons only. <u>Dust, exhaust gases</u> : Regular water sprinkling on unpaved haul roads and vulnerable areas, truck carrying soil, regular maintenance of equipment and trucks <u>Wastes</u> : A designated solid waste disposal site should be secured away from human settlements. In addition, a disposal site should be away from water streams and any archaeological and historical monuments. All areas designated for the storage of fuels, oils, chemicals or other hazardous liquids should have a dense base and be surrounded by a bund to contain any spillage. These areas should be covered by a roof structure to minimize the potential for infiltration and contamination of rainwater.
5 Others	(1) Impacts during Construction	(b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts?	Y	(b) Adequate measures will be planned and provided to mitigate the negative impacts to the natural environment during construction stage, such as no construction yard in the forest area and avoiding the heavy construction activities near forest areas during migration season for birds, etc.
		(c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?	Y	(c) Adequate measures will be planned and provided to reduce the negative impacts to the social environment during construction stage, such as temporary diversion road to reduce traffic jam at ROB' construction sites, etc.
		(d) If the construction activities will cause traffic congestion, are adequate measures considered to reduce such impacts?	Y	(d) There will be possibility to affect the road traffic near the construction sites of ROB during the construction stage. At the ROB construction sites, adequate measures will be planned, such as temporary diversion road to reduce traffic jam, periodically/timely announce the progress of work to the public. In addition, DFCCIL will coordinate with relevant authorities to mitigate the negative impacts on the traffic flow whenever necessary.
	(2) Monitoring	(a) Does the proponent develop and implement monitoring program for the environmental items that are considered to have potential impacts?	Y	(a) EMoP is proposed for pre-construction, construction and O&M stages of the Project, based on the impact prediction and mitigation measures proposed in the Final ESIA report.
(b) What are the items, methods and frequencies of the monitoring program?		Y	(b) Items, methods and frequencies of the monitoring are mentioned in EMoP in Final ESIA report.	

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigation Measures)
		(c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)?	Y	(c) Institutional arrangement to carry out EMoP is proposed including entities concerned and roles of each entity.
		(d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	N	(d) There is no regulatory requirement in India such as reporting system of monitoring results. However, the results of monitoring shall be reported to funding agency (JICA) through the project progress reports.
6 Note	Reference to Checklist of Other Sectors	(a) Where necessary, pertinent items described in the Forestry Projects checklist should also be checked (e.g., projects including large areas of deforestation).	N	(a) Agriculture is the main land use in the Rewari-Dadri section as well as JNPT- Vadodara section, though the Project has relevance to forestry department since the Project is proposed through the forest area. Then, in the Diva-Vasari section, the alignment of the proposed corridor has been planned parallel to the existing central railway track.
		(b) Where necessary, pertinent items described in the Power Transmission and Distribution Lines checklist should also be checked (e.g., projects including installation of power transmission lines and/or electric distribution facilities).	Y	(b) There is no relevant item such as power plant or distribution.
	Note on Using Environmental Checklist	(a) If necessary, the impacts to trans-boundary or global issues should be confirmed (e.g., the project includes factors that may cause problems, such as transboundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	N	(a) Although, there is a possibility of increased GHG emission due to the operation of heavy vehicles as well as traffic jams incidental to the construction works, this impact will be temporary. On the other hand, it is expected that the GHG emission will be reduced due to the modal shift of transportation from freight carrying road transport to the DFC. Therefore, no impacts are expected on transboundary or global issues, considering the Project characteristics and scale comprehensively.

Note:

- 1) Regarding the term "Country's Standards" mentioned in the above table, in the event that environmental standards in the country where the project is located diverge significantly from international standards, appropriate environmental considerations are required to be made. In cases where local environmental regulations are yet to be established in some areas, considerations should be made based on comparisons with appropriate standards of other countries (including Japan's experience).
- 2) Environmental checklist provides general environmental items to be checked. It may be necessary to add or delete an item taking into account the characteristics of the project and the particular circumstances of the country and locality in which it is located.

Source: JICA Survey Team

5.2 DRAFT MONITORING FORM

5.2.1 Supervision Work

Observation of the construction/operation works to ensure mitigation actions will be conducted during site inspections as routine supervision of the work. This work will be conducted as part of general operation working/maintenance progress including daily work. (Summary is shown in Table 5.2)

Draft monitoring forms are shown in **Form P1**, **Form C1** and **Form O1**.

Table 5.2 Summary of Environmental Monitoring Plan - Supervision Work

No.	Environment Component	Project Stage	Duration /Frequency	Planning and Implementation	Monitoring form
1	Social impact	Planning/Design phase	Monthly/Quarterly/bi-annually	SEMU technically assisted by Design Consultants	P1
		Construction	Monthly	Contractor	C1
2	Crops and vegetation	Planning/Design phase	Before commencement date	Design Consultant	P1
3	Impacts on freight corridor design	Planning/Design phase	Before the commencement of construction activities	Design Consultants	P1
4	Air Pollution	Construction	Weekly One check	Contractor	C1
5	Noise and vibration	Planning/Design phase	Monthly/ As necessary	Design Consultants	P1
		Construction	A monthly inspection of the construction yards must be carried out.	Contractor	C1
		Operation	Periodical	SEMU	O1
6	Water quality	Planning/Design phase	Before the commencement of construction activities	Design Consultants	P1
		Construction	During the construction stage a weekly site inspection is necessary for the proper assessment of the site.	Contractor	C1
7	Oil spills and hazardous wastes	Construction	One check	Contractor	C1
8	Spoil disposal	Construction	Weekly	Contractor	C1
9	Construction waste disposal	Construction	Weekly	Design Consultants and Contractor	C1
10	Land slide and soil erosion	Planning/Design phase	Site visits, one check	Design Consultants	P1
		Construction	During construction and specially during rainy seasons	Contractor and Supervision Consultant	C1
11	Loss of or damage to religious places and eco-sensitive areas.	Planning/Design phase	Before and during construction phase	Design Consultant, DFCCIL	P1
12	Earthworks operation	Construction	Before commencement date of construction	Contractor and Supervision Consultant	C1

No.	Environment Component	Project Stage	Duration /Frequency	Planning and Implementation	Monitoring form
13	Traffic safety	Planning/Design phase	Before commencement date of construction	Contractor	P1
		Construction	Monthly	Contractor and Supervision Consultant	C1
14	Disturbance to flora	Construction	Monthly	Contractor and Supervision Consultant	C1
15	Disturbance to fauna	Construction	Monthly	Contractor and Supervision Consultant	C1
16	Plantation	Operation	Assess growth every year for initial five years	SEMU	O1
17	Mangroves	Construction	Monthly	Contractor and Supervision Consultant	C1
18	Loss or damage of cultural sites or religious places	Construction	Before and during construction. Monitoring should be done once in six months.	Contractor/ Subcontractor and Supervision Consultant	C1
19	Construction labour force and its impacts	Planning/Design phase	Before the start of construction work As necessary	Constructor	P1
		Construction	Weekly	Constructor	C1
20	Work camp operation	Construction	Monthly	Contractor and Supervision Consultant	C1

Source: Environmental and Social Impact Assessment Study (ESIA) for Western Corridor of Dedicated Freight Corridor Project (Phase 2) for JNPT-Vadodara and Rewari-Dadri Sections, November 2011, DFCCIL

Form P1: Monitoring Form during Planning/Design Stage

a) Monitoring Period From Date Month Year

To Date Month Year

S.N.	Items	Check Point	Frequency	Evaluation or Mitigation status Y:Good /Yes N: Poor /No	Remark And Signature by Checker
1	Social impact	- Check notification	<input type="checkbox"/> Monthly/ <input type="checkbox"/> Quarterly/ <input type="checkbox"/> Bi-annually	<input type="checkbox"/> Y / <input type="checkbox"/> N	Signature by Checker
		- Check DFC payment record	<input type="checkbox"/> Monthly/ <input type="checkbox"/> Quarterly/ <input type="checkbox"/> Bi-annually	<input type="checkbox"/> Y / <input type="checkbox"/> N	
2	Crops and vegetation	- Interviews with local residents will also help in this matter.	<input type="checkbox"/> Before commencement date	<input type="checkbox"/> Y / <input type="checkbox"/> N	
3	Impacts on freight corridor design	- Check final design drawing and original plan	<input type="checkbox"/> Before the commencement of construction activities	<input type="checkbox"/> Y / <input type="checkbox"/> N	
4	Noise and vibration	- Determination of critical sites and methods of mitigation during the construction period.	<input type="checkbox"/> Monthly/ <input type="checkbox"/> As necessary	<input type="checkbox"/> Y / <input type="checkbox"/> N	
5	Water quality	- Check final planning and approve if proposal suitable	<input type="checkbox"/> Before the commencement of construction activities	<input type="checkbox"/> Y / <input type="checkbox"/> N	
6	Land slide and soil erosion	- Visit site and check land plans, alignment	<input type="checkbox"/> Site visits <input type="checkbox"/> one check	<input type="checkbox"/> Y / <input type="checkbox"/> N	
7	Loss of or damage to Religious places and eco-sensitive areas.	- Check encroachment on religious areas	<input type="checkbox"/> Before and during construction phase	<input type="checkbox"/> Y / <input type="checkbox"/> N	
		- Check eco-sensitive areas	<input type="checkbox"/> Before construction phase	<input type="checkbox"/> Y / <input type="checkbox"/> N	
Total				Yes___,No __	

Source: JICA Survey Team

Form C1: Monitoring Form during Construction Stage

a) Type of work: _____

b) Monitoring Season: Pre-monsoon / Post-monsoon / Winter

c) Monitoring Period From Date Month Year

To Date Month Year

S.N.	Items	Check Point	Frequency	Evaluation or Mitigation status Y: Good / Yes N: Poor / No	Remark And Signature by Checker
1	Social impact	- Check if the community has brought the problem to the notice of the Consultant and Client	<input type="checkbox"/> Monthly	<input type="checkbox"/> Y / <input type="checkbox"/> N	Signature by Checker
2	Air pollution	- Check watering as per the frequency given in the EMP.	<input type="checkbox"/> Weekly	<input type="checkbox"/> Y / <input type="checkbox"/> N	
		- Proper implementation can be achieved by site inspection along with interviews with local residents.	<input type="checkbox"/> Weekly	<input type="checkbox"/> Y / <input type="checkbox"/> N	
3	Noise and vibration	- Check that the Contractor is performing mitigation measures.	<input type="checkbox"/> Monthly	<input type="checkbox"/> Y / <input type="checkbox"/> N	
		- This can be achieved by interviewing the locals and site inspection.	<input type="checkbox"/> Monthly	<input type="checkbox"/> Y / <input type="checkbox"/> N	
4	Water quality	- Visit site and check drain provision/ functioning	<input type="checkbox"/> Weekly	<input type="checkbox"/> Y / <input type="checkbox"/> N	
5	Oil spills and hazardous wastes	- Check the mitigation measures.	<input type="checkbox"/> One check	<input type="checkbox"/> Y / <input type="checkbox"/> N	
		- A fortnightly inspection is necessary until the completion of the project.	<input type="checkbox"/> One check	<input type="checkbox"/> Y / <input type="checkbox"/> N	
6	Spoil disposal	- A monthly inspection of the disposal sites along with the review of the design plan is a better way of assessment.	<input type="checkbox"/> Weekly	<input type="checkbox"/> Y / <input type="checkbox"/> N	
7	Construction waste disposal	- Interviews with local residents will also give a proper assessment of the issue.	<input type="checkbox"/> Weekly	<input type="checkbox"/> Y / <input type="checkbox"/> N	
8	Land slide and soil erosion	- A site inspection along with the review of the design plans is necessary.	<input type="checkbox"/> During rainy seasons	<input type="checkbox"/> Y / <input type="checkbox"/> N	

S.N.	Items	Check Point	Frequency	Evaluation or Mitigation status Y: Good / Yes N: Poor / No	Remark And Signature by Checker
9	Earthworks operation	- Ensure the contractor performs detailed design and instability checks	<input type="checkbox"/> Before commencement date of construction	<input type="checkbox"/> Y / <input type="checkbox"/> N	
		- Check if erosion or instabilities were observed.	<input type="checkbox"/> Before commencement date of construction	<input type="checkbox"/> Y / <input type="checkbox"/> N	
		- The conditions at the site can be observed by a site inspection along with review of the design plan.	<input type="checkbox"/> Before commencement date of construction	<input type="checkbox"/> Y / <input type="checkbox"/> N	
10	Traffic safety	- Checking the traffic problems at the construction site.	<input type="checkbox"/> Monthly	<input type="checkbox"/> Y / <input type="checkbox"/> N	
11	Disturbance to flora	- Inspect ROW boundary and adjacent area	<input type="checkbox"/> Weekly / <input type="checkbox"/> Monthly	<input type="checkbox"/> Y / <input type="checkbox"/> N	
12	Disturbance to fauna	- Visit site and check the proposed alignment and construction area	<input type="checkbox"/> Monthly	<input type="checkbox"/> Y / <input type="checkbox"/> N	
13	Mangroves	- Visit site and check the proposed alignment and drain/waste material around mangroves	<input type="checkbox"/> Monthly	<input type="checkbox"/> Y / <input type="checkbox"/> N	
14	Loss or damage of cultural sites or religious places	- Interviews with local residents will also give a proper assessment of the issue.	<input type="checkbox"/> Once in six months.	<input type="checkbox"/> Y / <input type="checkbox"/> N	
15	Construction labour force and its impacts	- Check if the Contractors are following the mitigation measures	<input type="checkbox"/> Weekly	<input type="checkbox"/> Y / <input type="checkbox"/> N	
		- Check with the communities and construction staff if any conflict has occurred; if yes find out reason.	<input type="checkbox"/> Weekly	<input type="checkbox"/> Y / <input type="checkbox"/> N	
		- This can be achieved by regular site inspections. The frequency should be once in fifteen days.	<input type="checkbox"/> Weekly	<input type="checkbox"/> Y / <input type="checkbox"/> N	
16	Work camp operation	- During construction and after completion of the works. The inspection should be planned once every two months throughout the project period	<input type="checkbox"/> Monthly	<input type="checkbox"/> Y / <input type="checkbox"/> N	
Total				Yes __, No __	

Source: JICA Survey Team

Form O1: Monitoring Form during Operation Stage

a) Operation Stage: _____

b) Monitoring Season: Pre-monsoon / Post-monsoon / Winter

c) Monitoring Period From Date Month Year
To Date Month Year

S.N.	Items		Frequency	Evaluation or Mitigation status Y:Good /Yes N: Poor /No	Remark And Signature by Checker
1	Noise and vibration	- Visit site and compare with Normal situation	Periodical	<input type="checkbox"/> Y / <input type="checkbox"/> N	Signature by Checker
2	Plantation	- The number of trees surviving during each visit shall be compared with the number of sapling plant	Assess growth every year for initial five years <input type="checkbox"/> 1st/ <input type="checkbox"/> 2nd/ <input type="checkbox"/> 3rd / <input type="checkbox"/> 4th / <input type="checkbox"/> 5th	<input type="checkbox"/> Y / <input type="checkbox"/> N	
		- Record the growth of plantation	Assess growth every year for initial five years <input type="checkbox"/> 1st/ <input type="checkbox"/> 2nd/ <input type="checkbox"/> 3rd / <input type="checkbox"/> 4th / <input type="checkbox"/> 5th	<input type="checkbox"/> Y / <input type="checkbox"/> N	
Total				Yes___, No ___	

Source: JICA Survey Team

5.2.2 Impact and Mitigation Monitoring

Environmental and social impact/mitigation monitoring shall be conducted to determine the actual and social impacts. Summary of EMP for impact and mitigation monitoring is shown in Table 5.3

Draft monitoring forms are shown in **Form C2-C8** and **Form O2**.

Table 5.3 Summary of Environmental Monitoring Plan – Impact and Mitigation Monitoring

No.	Environment Component	Project Stage	Parameters	Location	Duration /Frequency	Institutional Responsibility	Monitoring Form
1	Air pollution	Construction	PM10, PM2.5, CO, SO ₂ , NO _x , Lead	At construction sites in sensitive and critical areas along alignment.	24 hours or eight hours (CO), at least once in every season (once in three months) except monsoon for minimum three days.	Construction Contractor through MoEF Approved Laboratories	C2
2	Noise and Vibration	Construction	Noise level in dB (A) and Vibration in dB	Next to identified sensitive receptor along alignment basically near predicted points, major construction sites in any inhabited areas as well as the operational areas like crusher units and batch mixing plants	Hourly records, for 24 hours for minimum three days, four times a year (preferably in each season)	Construction Contractor	C3
		Operation	Railway Noise level in dB (A) and Vibration in dB	Next to identified sensitive receptor along alignment basically near predicted points	Monthly during first operation year, once a year	SEMU	O2
3	Water quality	Construction	See Note	Surface water: at two points for (upstream and downstream) 15 important rivers	Monthly during construction periods near the river	Construction Contractor	C4
				Ground water: location shall be decided by SPCB	Monthly during construction/excavation periods		
				Drinking water and waste water: each labour camps	Weekly		
4	Ground water level	Construction	ground water level	Dahanu Taluka and Aravalli site. The location shall be decided by SPCB	Before construction monthly During construction/excavation periods continuous	Construction Contractor	C5
5	Land slide and soil erosion	Construction	Surface status of ground modification	A site inspection along with the review of the design plans if necessary.	Rainy seasons.	Construction Contractor	C6
6	Plantation	Construction	Number of railway side plantation	Along the side of the track	Comparison should be done every six months	Construction Contractor	C7
7	Borrow area	Construction	Borrow areas re-development	Identified borrow areas	four times a year (preferably in each season)	Construction Contractor	C8

Note: Odor, conductivity, pH, DO, BOD, TDS, TSS, oil and grease, chlorides, sulphates, total nitrogen, total phosphate, coli forms and heavy metals

Source: Environmental and Social Impact Assessment Study (ESIA) for Western Corridor of Dedicated Freight Corridor Project (Phase 2) for JNPT-Vadodara and Rewari-Dadri Sections, November 2011, DFCCIL

Form C2: Monitoring of Air Quality

a) Type of work: _____

b) Monitoring Season: Pre-monsoon / Post-monsoon / Winter

c) Monitoring Period From Date Month Year

To Date Month Year

Item Unit	Date	Item	1	2	3	4	5	6	Remark
			PM ₁₀ µg/m ³	PM _{2.5} µg/m ³	CO ppm	SO ₂ µg/m ³	NO _x µg/m ³	Lead µg/m ³	
No.1	(Detail of Location)	Max							
		Ave							
		Min							
No.2	(Detail of Location)	Max							
		Ave							
		Min							
No.3	(Detail of Location)	Max							
		Ave							
		Min							
		Max							
		Ave							
		Min							
NEQS			100	60	04µg/m ³	80	80	1	
WHO Standards			150-230	70	30	400	100-150		
Duration			24hours	24hours	24hours	24hours	24hours	24hours	

Source: prepared by JICA Survey Team based on JICA guideline

Form C3: Monitoring of Noise and Vibration

a) Type of work: _____

b) Monitoring Frequency: 1st / 2nd / 3 rd

c) Monitoring Period From Date Month Year
 To Date Month Year

	Item	Unit	Date1	Date2	Date3	Remark (Date)
			DD/MM /YY	DD/MM /YY	DD/MM /YY	
NEQS	Noise Residential Area Day Time (6:00-22:00); 55 dB(A) Night Time(22:00-6:00);50dB(A) Silent Area Day Time (6:00-22:00); 45 dB(A) Night Time(22:00-6:00);40dB(A)					
No.1	(Detail of Location)	Noise-1	L _{eq}	dB(A)		
		Noise-2	L _{min}	dB(A)		
		Noise-3	L _{max}	dB(A)		
		Vib-1	L ₁₀	dB		
No.2	(Detail of Location)	Noise-1	L _{eq}	dB(A)		
		Noise-2	L _{min}	dB(A)		
		Noise-3	L _{max}	dB(A)		
		Vib-1	L ₁₀	dB		
No.3	(Detail of Location)	Noise-1	L _{eq}	dB(A)		
		Noise-2	L _{min}	dB(A)		
		Noise-3	L _{max}	dB(A)		
		Vib-1	L ₁₀	dB		
	(Detail of Location)	Noise-1	L _{eq}	dB(A)		
		Noise-2	L _{min}	dB(A)		
		Noise-3	L _{max}	dB(A)		
		Vib-1	L ₁₀	dB		

Source: prepared by JICA Survey Team based on JICA guideline

Form C4: Monitoring of Water Quality

a) Type of work: _____

b) Monitoring Times : 1st / 2nd / 3rd

c) Monitoring Period From Date Month Year

To Date Month Year

No.	Name of River	Location	1	2	3	4	5	6	7	8	9	10	11	12	13
			Temp	pH	E.C	TSS	TDS	Turbidity	T. Hardness	DO	BOD	COD	Nitrate	Ammonia	T.Coli
Unit			°C	-	µS/cm	mg/l	mg/l	NTU	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	MPN/100 ml
1		Upstream													
		Down Stream													
2		Upstream													
		Down Stream													
3		Upstream													
		Down Stream													
4		Upstream													
		Down Stream													
5		Upstream													
		Down Stream													
No.	Name of River	Location	14	15	16	17	18	19	20	21	22	23	24	25	
			F.coli	Flow-Velocity	Chloride	Sulphate	Calcium	Magnesium	Fluoride	O&G	Zinc	Manganese	Iron	Copper	
Unit			MPN/100 ml	m/s	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	
1		Upstream													
		Down Stream													
2		Upstream													
		Down Stream													
3		Upstream													
		Down Stream													
4		Upstream													
		Down Stream													
5		Upstream													
		Down Stream													

Source: prepared by JICA Survey Team based on JICA guideline

Form C5: Monitoring of Groundwater Level

a) Type of work: _____

b) Monitoring Times : 1st / 2nd / 3rd

c) Monitoring Frequency : Daily / Weekly / Monthly

d) Monitoring Period From Date Month Year

To Date Month Year

e) Construction Stage : Pre-Construction / Construction / Post-Construction

Date	Measure Point					
	No.1 (Detail of Location)	No.2	No.3	No.4	No.5	
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
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26						
27						
28						
29						
30						
31						
31						

Source: prepared by JICA Survey Team based on JICA guideline

Form C6: Monitoring of Land Slide and Soil Erosion

a) Detail of location: _____

b) Type of work: _____

c) Monitoring Times : 1st / 2nd / 3rd

d) Monitoring Period From Date Month Year

To Date Month Year

S.N.	Items	Unit	Detail	Remark
1	Current land use			
2	Size of land slide/soil erosion	Km x Km.		
3	Reason of land slide/soil erosion			
4	Past record	DD/MM/YY		
5	Nearest water source (if any)	Nos., kind		

Source: prepared by JICA Survey Team based on JICA guideline

Form C7: Monitoring of Plantation

a) Type of work: _____

b) Monitoring Times : 1st / 2nd / 3rd

c) Monitoring Period From Date Month Year

To Date Month Year

S.N	Location	Block	Species	Number of trees	Height of trees (m) Max/Ave/Min	BHD	Growth Excellent/ Good/ Poor	Remark

Source: prepared by JICA Survey Team based on JICA guideline

Form C8: Monitoring of Borrow Area

a) Location: _____

b) Monitoring Times: 1st / 2nd / 3rd

c) Monitoring Period From Date Month Year

To Date Month Year

d) Construction Stage : Pre-Construction / Construction / Post-Construction

S.N.	Items	Unit	Detail	Remark
1	Current land use			
2	Size of borrow area	km x km.		
3	No. of settlement in the borrow area	Nos.		
4	No. of trees in the borrow area	Nos.		
5	Scale of haul road in the barrow area (if any)	Nos. x Length(km) x Width (m)		
6	Detail of the existing structure (if any)	Nos., kind		
7	Detail of the existing infrastructure (if any)	Nos., kind		
8	Nearest water source (if any)	Nos., kind		

Source: prepared by JICA Survey Team based on JICA guideline

PART III
**ASSISTANCE FOR PREPARATION OF REHABILITATION
AND RESETTLEMENT PLAN**

PART III ASSISTANCE FOR PREPARATION OF REHABILITATION AND RESETTLEMENT PLAN

CHAPTER 1 ASSISTANCE FOR BASELINE SURVEY AND CENSUS

1.1 INTRODUCTION

For a project involving involuntary displacement of 400 or more families en masse in plain areas, or 200 or more families en masse in tribal or hilly areas, the National Rehabilitation and Resettlement Policy 2007 (NRRP 2007) requires the administrator for rehabilitation and resettlement to undertake a Baseline Survey and Census for identification of the persons and families likely to be affected (Sec.6.2). Specifically, the following information below needs to be collected through the Baseline Survey and Census as per NRRP 2007:

- i) Members of the family who are permanently residing, engaged in any trade, business, occupation or vocation in the affected area;
- ii) Families who are likely to lose, or have lost, their house, agricultural land, employment or alienated wholly or substantially from the main source of their trade, business, occupation or vocation;
- iii) Agricultural laborers and non-agricultural laborers;
- iv) Families belonging to the Scheduled Caste or Scheduled Tribe categories;
- v) Families that are landless (not having homestead land, agricultural land, or either homestead or agricultural land) and below poverty line, but residing continuously for a period of not less than three years in the affected area preceding the date of declaration of the affected area; and
- vi) Scheduled Tribes families who are or were in possession of forest lands in the affected area prior to the 13th day of December 2005.

To comply with the requirements as well as to support the preparation of RRP, JST has undertaken the Baseline Survey and Census for all PAFs in 14 districts to be affected by the Project. In addition to gathering information on the demographic and socio-economic status of these PAFs and the nature and type of project impacts that will be experienced by them, the Baseline Survey and Census also entails inventory of assets to be affected, of each of the PAFs as well as common property resources.

1.2 APPROACH AND METHODOLOGY

The JST has employed a local consultant (DHI (India) Water & Environment Pvt Ltd.) for undertaking the Baseline Survey and Census in most of the affected districts and villages. For a limited number of districts and villages where public resentment to land acquisition and discontent with the type and/or the amount of compensation has been particularly strong, DFCCIL has directly contracted with another organization, the Consultants for Rural Area Development Linked Economy (CRADLE), to expedite the process and complete the Baseline Survey and Census in a timely manner. The demarcation of work for the Baseline Survey and Census between JST (DHI) and CRADLE is summarized in Table 1.1.

Table 1.1 Demarcation of Work for Baseline Survey and Census

Consultant	State	Districts	Section
CRADLE	Maharashtra	Raigad	JNPT-Vadodara
		Thane (some villages were surveyed by JST (DHI))	
JST(DHI)	Gujarat	Vadodara, Bharuch, Surat, Navsari, Valsad	Rewari-Dadri
	Rajasthan	Alwar	
	Haryana	Faridabad, Gurgaon, Rewari, Palwal, Mewat	
	Uttar Pradesh	Gautam Buddha Nagar	

Note: As of February 2012, the Baseline Survey and Census has not been completed in four villages in Faridabad District due to public resentment to land acquisition.

Source: JICA Survey Team

In each district, the Baseline Survey and Census was carried out with the following steps:

(1) Preparation of the Survey Form

To collect necessary information, a set of survey forms have been prepared in consultation with DFCCIL as follows (See Appendix III.1.1):

- Form 1 (a): Census questionnaire on identification of project affected family (PAF)
- Form 1 (b): Census questionnaire on household profile
- Form 2: Asset inventory
- Form 3: Asset inventory (for community property)
- Form 4: Socio-economic survey

The forms, which are to be filled up by each household head, are based on the same survey carried out for Phase 1 of the DFC Project which is in a more advanced stage and was finalized after pilot trial in the field. The survey forms are available in three vernacular languages, namely Hindi, Gujarati and Marathi.

(2) Review of Land Plan and Various Notifications

Prior to the field survey, the JST reviewed land plans and various notifications that were available to check possible discrepancies and errors. The following documents have been used to identify affected plots and affected populations.

- *20A Notification* is an official document declaring the intention of the Central Government to acquire lands in question for execution of a special railway project (DFC). The Notification lists the serial number and areas of affected plots in each village and district.
- *20E Notification* was published after no objection from 20A was made within 30 days of its publication, otherwise, such objections will be disallowed by competent authority. This is an official document declaring that the lands mentioned therein should be acquired for execution of a special railway project (DFC). The document lists the serial number of affected plots and the name of titleholders registered in each plot. In most cases, however, the official notification was not available when the Baseline Survey and Census was carried out and the field survey was carried out based on the draft version of 20E notifications.
- *Joint Measurement (JM) List* is prepared by a joint survey with participation of project-affected persons (PAPs) and lists the serial number of affected plots and the name of titleholders registered in each plot. In some villages, particularly in Thane District, PAPs demanded the issuance of JM List prior to the Baseline

Survey and Census because existing official records tend to be outdated and may not be accurate.

- *Land Plan* shows an alignment of the proposed railway lines, affected plots, and the boundary of project's ROW. Project affected population whose residence fall within ROW are subject to resettlement.

The availability of above-mentioned documents in each district is summarized in Table 1.2.

Table 1.2 Availability of Various Documents

District	20A	20E	Draft 20E	JM	Land Plan
Raigad	c	c	a	a	a
Thane	c	c	a	a	a
Valsad	c	c	a	d	a
Navsari	c	c	a	d	a
Surat	c	c	a	a	a
Bharuch	c	c	d	a	a
Vadodara	c	c	d	a	a
Alwar	b	c	a	d	a
Mewat	c	d	a	d	a
Palwal	b	c	a	d	a
Rewari	b	c	a	d	a
Gurgaon	c	c	a	d	a
Faridabad	c	d	a	d	a
Gautam Buddha Nagar	c	c	a	d	a

Note: a - Available/partly available and the Baseline Survey and Census were carried out based on this document; b - Available/partly available; c - Available as of December 2011, but it was not available at the time of the survey; d - not available as of December 2011; See the Baseline Survey and Census report of each district for specific notification number and issue date, the date when the JICA Survey Team received the documents.

Source: JICA Survey Team

(3) Field Survey

Training for the field surveyors and their advance site visit were conducted before the commencement of the field survey in order to avoid any confusion among the survey respondents. During the survey, a senior socio-economic expert supervised and was responsible for the survey teams. Under the supervision of the socio-economic expert, two to three sub-supervisors/field coordinators were assigned for the day-to-day management of the field survey. In total, as many as 15 survey teams which consist of one chief surveyor and two surveyors were mobilized to conduct the field survey.

Some PAPs have not been listed in above-mentioned notifications because they have no legal title-holding status for respective land plots or the record is outdated. The surveyors identified them during the field survey and included their information in the Baseline Survey and Census.

(4) Data Compilation and Report Writing

Upon the completion of the survey at the district-level, the information gathered were entered into an excel datasheet for compilation and analysis. A Baseline Survey and Census report for each district was prepared based on this and reviewed by the JST before being finalized.

1.3 SURVEY SCHEDULE

The JST started the Baseline Survey and Census in November 2010. The majority of the survey was completed by October 2011, but the field survey was continued for a few villages in Faridabad and Thane Districts until the end of February 2012. However, the field survey could not be conducted at four villages in Faridabad because of public resentment.

Table 1.3 Timetable of Baseline Survey and Census

District	2010			2011												2012		
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Raigad													=====					
Thane			=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
Valsad		=====		=====	=====	=====	=====	=====	=====									
Navsari			=====	=====	=====	=====	=====	=====	=====									
Surat		=====		=====	=====	=====	=====	=====	=====	=====	=====	=====	=====					
Bharuch			=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====					
Vadodara		=====		=====	=====	=====	=====	=====										
Alwar		=====		=====	=====	=====	=====											
Mewat							=====	=====	=====	=====	=====	=====	=====					
Palwal				=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
Rewari					=====	=====	=====											
Gurgaon						=====	=====											
Faridabad								=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====
Gautam Buddh Nagar						=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====	=====

Note: The Baseline Survey and Census is not completed in four villages in Faridabad District; One titleholder in Palwal who previously declined to participate in the survey came to the DFCCIL Office in Delhi in December and filled the survey form for his family; One titleholder in Gautam Buddh Nagar District who had been hospitalized and thus was unreachable until December.

Source: JICA Survey Team

1.4 RESULTS OF BASELINE SURVEY AND CENSUS

The Baseline Survey and Census has identified and surveyed 61,367 PAPs and 9,637 PAFs who reside in 6,188 surveyed plots¹. Table 1.4 provides the district-wise summary of survey coverage as of the end of February 2012, while the result of the Baseline Survey and Census is summarized in Attachment III.1.2.

Table 1.4 District-wise Summary of Survey Coverage

District/ Section	No of Affected Plots as per 20E ¹	No of Affected Plots Surveyed	No of Affected Titleholders as per 20E	No of Affected PAF Identified in the Field	No of PAF Surveyed	No of PAP Identified and Surveyed
Raigad	136	140	393	404	342	1,390
Thane	1,588	1,173	7,669	5,804	5,658	27,771
Valsad	417	357	2,859	485	485	3,208
Navsari	461	380	1,466	521	521	2,869
Surat	641	411	2,761	373	373	2,849
Bharuch	729	489	2,939	446	446	3,359
Vadodara	305	214	638	211	211	1,639
Rewari	707	563	1,400	259	259	2,326
Alwar	512	462	1,178	307	307	3,442
Mewat	889	639	3,050	292	292	4,263
Gurgaon	319	173	433	133	133	1,042
Palwal	665	405	1,887	212	212	2,202
Faridabad ²	1,238	669	1,489	307	307	4,216
G.B. Nagar	169	113	266	91	91	791
Total	8,776	6,188	28,428	9,845	9,637	61,367

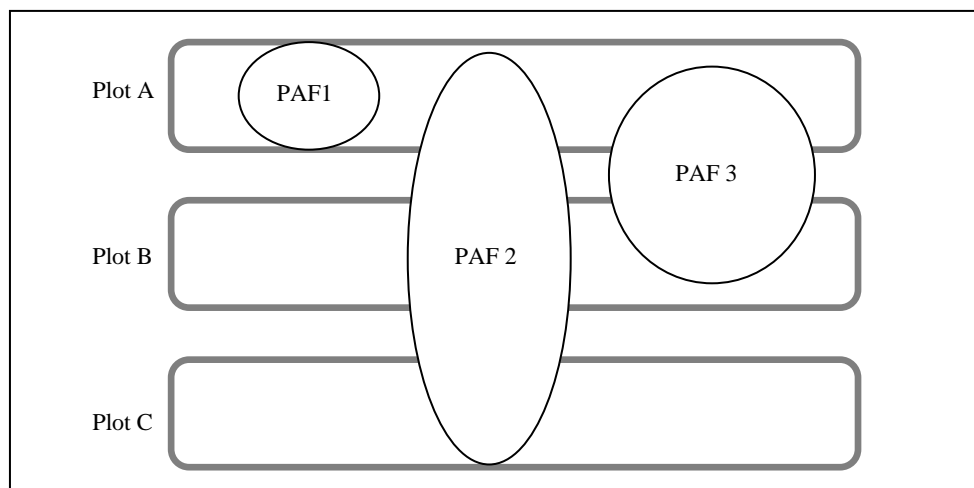
Note: ¹ JM and/or PAP lists are used in Raigad, Thane, Bharuch and Vadodara Districts; ² Four villages in Faridabad Districts have not been surveyed due to intervention by the local politician; the number of PAP identified in the field is often greater than the number of titleholders listed in draft 20E because PAPs include family members of titleholders who do not have the legal title-holding status. Meanwhile, the total number of PAF is much fewer than the total number of titleholder because more than one titleholder constitutes a single family. In many cases, all the titleholders listed against the same plot number are members of the same family.

Source: Notification 20A & 20E/Draft 20E including JM list & PAP list and Field Survey Data

(1) Cautiously Note for Reading and Understanding the Baseline Survey and Census Results

Many plots are owned by multiple titleholders and many titleholders own multiple plots. This makes the relation between plots and PAFs/PAPs extremely complex. Figure 1.1 shows a hypothetical relation between three plots and three PAFs. While the number of plots and PAFs is the same, the ownership pattern is quite complex. Plot A is owned by three PAFs, Plot B is owned by two PAFs and Plot C is owned by one PAF. Likewise, one family (PAF2) owns three plots and so on. As such, the number of plot is not necessary a proper proxy for the number of PAFs and PAPs, and vice versa. Similarly, several common property resources, especially village common land, stretch over multiple land plots, causing discrepancy between the number of common property plots and the number of actual properties.

¹ Plots with titleholders are considered “surveyed” when titleholders residing in respective plots filled the survey form. Plots where all registered titleholders were absent or rejected to provide their socio-economic information are treated either as “absent” or “rejected”. Plots without titleholders (government plots etc.), are considered “surveyed” as far as the survey team visited the plots and checked the status (confirmed the (non-)existence of non-titleholders etc.).



Source: JICA Survey Team

Figure 1.1 Land Use Category of Surveyed Plots

How to interpret and compare plot also requires caution. Plots can be divided into sub-plots and in some cases; there are sub-plots of sub-plots. The way plots are listed in notifications and JM lists are not consistent and therefore, the number of plots is not necessarily an accurate proxy to ascertain the degree of impacts in each district.

(2) Limitation of the Baseline Survey and Census

1) Survey Coverage

There are 2,588 plots (29%) which could not be surveyed either because all titleholders registered to the plots were absent during the survey period or they have rejected to participate in the survey. The share of incomplete plots is particularly high in Faridabad where the survey is completed for less than half of the affected plots.

2) Potential Biases

With a few exceptions (area and number of affected plots), the survey results are entirely based on information provided by PAFs and as such, may not be accurate. A bias can occur in both directions. For example, a PAF may report income figure higher than their actual income with the hope that compensation may be proportional to the reported income. On the other hand, they might report less than the actual figure thinking that poorer family may be entitled to a more generous compensation.

(3) Lessons Learned and Recommendations

In addition to the issues and limitations discussed above, some of the challenges the JST faced during the Baseline Survey and Census will have some repercussions on the project, particularly in the land acquisition process. They are:

1) Legacy of land acquisitions in the Past

The Baseline Survey and Census took much longer than initially planned and are not yet completed due to the public's resentment to land acquisition. In some cases, public resentment to land acquisition stems from the legacy of land acquisitions in the past which PAFs perceive to be unfair. Although DFCCIL is not involved in any of the past acquisitions, PAFs may see the ongoing work as an 'additional' effort to take their land.

The fact that PAPs may have distrust and doubt about land acquisition in general in the first place should be noted when communicating with PAPs.

2) Coordinated Communication

During the Baseline Survey and Census, JST found that some PAPs are quite confused with different and even conflicting information they were provided. For example, one PAP in the Thane District contacted JST to confirm the degree of impact he will experience because he received conflicting information concerning his residence from different sources. Several changes in alignment have caused similar confusions, often resulting in frustration in the side of the affected. It is of great importance that all officers involved speak in one voice, particularly for sensitive issues such as the type and amount of compensation.

CHAPTER 2 ASSISTANCE FOR RRP PREPARATION

The JST assisted DFCCIL to prepare the RRP for Phase 2 section of DFC Western Corridor following 'JBIC Guidelines for Confirmation of Environmental and Social Considerations, 2002 (Ex-JBIC Guidelines)'. Although the Baseline Survey and Census in four villages in Faridabad District could be conducted because of public resentment, the RRP report has been prepared during the survey. This chapter summarizes the prepared RRP report.

2.1 CONFIRMATION OF THE LEGAL FRAMEWORK AND JUSTIFICATION FOR RESETTLEMENT

2.1.1 Legal Framework of Resettlement of the DFC Project

Applicable laws on land acquisition and resettlement for the DFC Project are mainly the Railways (Amendment) Act 2008 and NRRP 2007. In addition, the ex-JBIC Guidelines 2002 is adopted since the Japanese ODA loan will be utilized for the implementation of the Project. In this section, provisions and requirements under these laws and guidelines are summarised.

2.1.2 Railways (Amendment) Act, 2008

The Railways Act, 1989, an Act to consolidate and amend the law relating to Railways was amended in 2008. This Act may be called the Railways (Amendment) Act, 2008 (RAA 2008). The RAA 2008 has been prepared for the execution of a special railway project, which means a project, notified as such by the Central Government from time to time, for providing national infrastructure for a public purpose in a specified time-frame, covering one or more states or the Union territories.

The RAA 2008 provides land acquisition process and procedures for the special railway project such as DFC Project, including valuation method of land compensation. The amendments include insertion of following clauses:

- 7A (competent authority) - means any person authorized by the Central Government by notification, to perform the functions of the competent authority for such area as may be specified in the notification;
- 29A (person interested) – (i) all persons claiming an interest in compensation to be made on account of the acquisition of land under this Act; (ii) tribal and other traditional forest dwellers, who have lost any traditional rights recognized under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006; (iii) a person interested in an easement affecting the land; and (iv) persons having tenancy rights under the relevant state laws;
- 37A (special railway project) – means a project, notified as such by the Central Government from time to time, for providing national infrastructure for a public purpose in a specified time-frame, covering one or more States or the Union territories;
- Chapter IVA – land acquisition for a Special Railway Project.

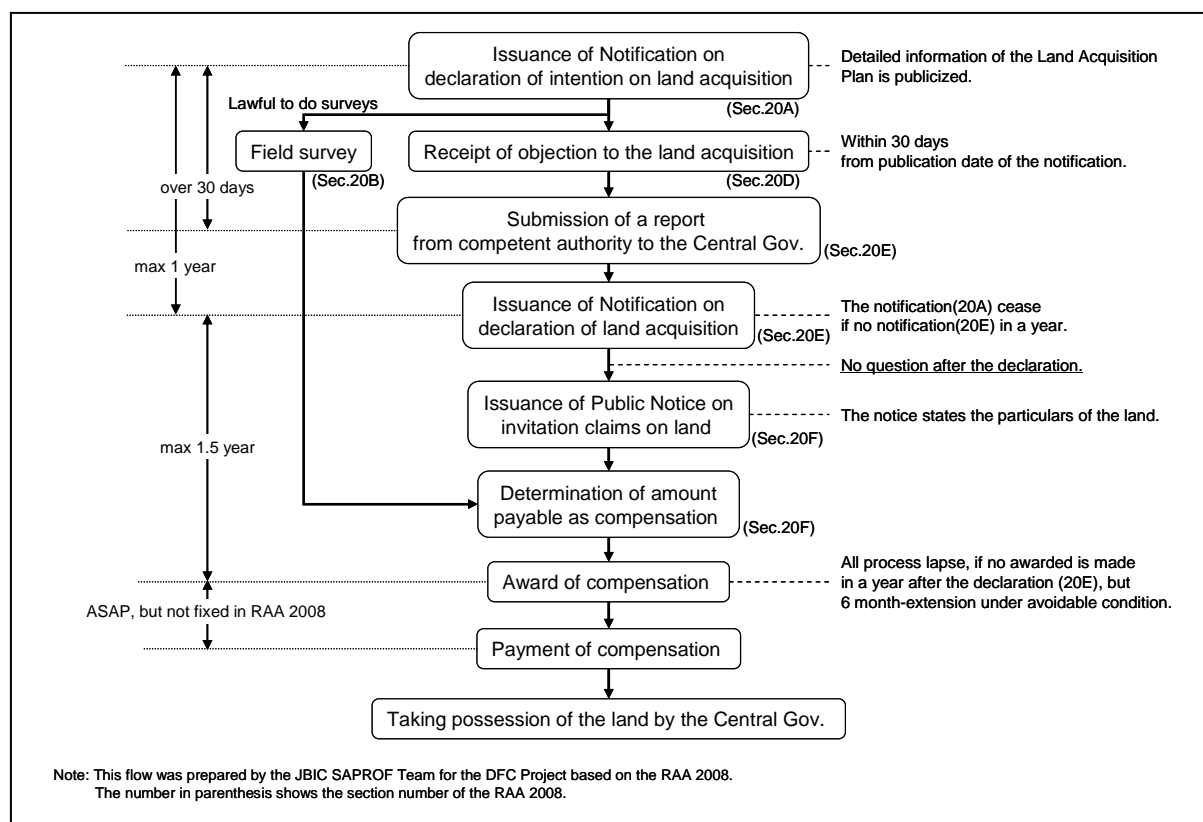
The main elements of Chapter IVA are shown in Table 2.1.

Table 2.1 Main Elements of Land Acquisition for a Special Railway Project

Section	Description
20A Power to acquire land, etc.	Declaration of intention to acquire land required for execution of a special railway project. This is the first notification and empowers the competent authority to cause the substance of the notification.
20D Hearing of objections, etc.	Objections must be made by interested persons within 30 days from the date of publication of the notification under sub-section (1) of Section 20A.
20E Declaration of acquisition	On publication of the declaration under sub-section (1), the land shall be vested absolutely in the Central Government free from all encumbrances.
20F Determination of amount payable as compensation	Amount to be paid as compensation shall be determined by an order of the competent authority. The competent authority shall make an award under this section within a period of one year from the date of publication of the declaration.
20G Criterion for determination of market value of land	<p>- The competent authority shall adopt the following criteria in assessing and determining the market-value of the land - (i) the minimum land value, if any, specified in the Indian Stamp Act, 1899, for the registration of sale deeds in the area, where the land is situated; or (ii) the average of the sale price for similar type of land situated in the village or vicinity, ascertained from not less than fifty per cent of the sale deeds registered during the preceding three years, where higher price has been paid, whichever is higher.</p> <p>-The competent authority shall, before assessing and determining the market value of the land being acquired under this Act - (a) ascertain the intended land use category of such land; and (b) take into account the value of the land of the intended category in the adjoining areas or vicinity, for the purpose of determination of the market-value of the land being acquired.</p> <p>-In determining the market-value of the building and other immovable property or assets attached to the land or buildings which are to be acquired, the competent authority may use the services of a competent engineer or any other specialist in the relevant field, as may be considered necessary by the competent authority.</p> <p>-The competent authority may, for the purpose of determining the value of trees and plants, use the services of experienced persons in the field of agriculture, forestry, horticulture, sericulture, or any other field, as may be considered necessary by him.</p> <p>-For the purpose of assessing the value of the standing crops damaged during the process of land acquisition proceedings, the competent authority may utilize the services of experienced persons in the field of agriculture as he considers necessary.</p>
20I Power to take possession	To surrender or deliver possession thereof to the competent authority or any person duly authorized by it in this behalf within a period of 60 days of the service of the notice.
20N land acquisition Act 1 of 1894 not to apply	Nothing in the land acquisition Act, 1894 shall apply to an acquisition under this Act.
20O Application of the National Rehabilitation and resettlement Policy (NRRP), 2007 to persons affected due to land acquisition	The Provisions of NRRP, 2007 for the Project Affected Families, Notified by the Government of India in the Ministry of Rural Development vide number F.26011/4/2007-LRD, dated the 31st October, 2007, shall apply in respect of acquisition of land by the Central Government under this Act.

Source: Prepared by JICA Survey Team based on RAA 2008

A flowchart of the land acquisition process is shown in Figure 2.1.



Source: Prepared by JICA Survey Team based on the RAA 2008

Figure 2.1 Flowchart of the Land Acquisition Process under Railways (Amendment) Act, 2008

2.1.3 National Rehabilitation and Resettlement Policy, 2007

As per Section 200 of the RAA 2008, NRRP 2007 is adopted for the DFC Project.

NRRP 2007 for PAFs has been prepared by the Department of Land Resources, Ministry of Rural Development, and Government of India. The policy stipulates the minimum benefits to be ensured for persons displaced due to acquisition of land for public purposes. The objectives of the policy are:

- (a) to minimize displacement and to identify the non-displacing or least-displacing alternatives;
- (b) to plan the Resettlement and Rehabilitation of PAFs, or project affected households (PAHs), including tribal and vulnerable households;
- (c) to provide improved standard of living to PAFs or PAHs; and
- (d) to facilitate a harmonious relationship between DFCCIL/CA and PAFs.

The policy is applicable to projects displacing 400 or more families *en masse* in plain areas, or 200 or more families *en masse* in tribal or hilly areas, Desert Development Programme (DDP) blocks, areas mentioned in Schedule V and Schedule VI of the Constitution of India. However, the basic principles of policy can be applied to rehabilitation and resettlement of PAFs regardless of the number of PAFs. The policy provides specific measures for vulnerable and poor groups. As of now there is no law on

rehabilitation and resettlement in the country, though the land acquisition, Rehabilitation and Resettlement Bill 2011 (Bill No. 77 of 2011) has been introduced in Lok Sabha (parliament of Indian government) in September 2011.

2.1.4 State Legislation on Land Compensation Rate

When the Resettlement Action Plan for the Eastern Corridor was prepared, one clause which allows CA to adopt the state legislation on the land compensation rate was added. Therefore, the following state legislation of Haryana State and Maharashtra State needs to be followed:

- Haryana Government Revenue and Disaster Management Department Notification (11 August 2011) - Haryana Government's Amendments in the Rehabilitation and Resettlement Policy 2010; and
- Ministry of Forest and Revenue Government. Resolution (5 September 2011) - Appointment of committee to decide the rate of compensation for land to be acquired by DFCCIL in the state of Maharashtra.

2.1.5 Ex-JBIC Guidelines for Confirmation of Environmental and Social Considerations

The ex-JBIC Guidelines were/are applied commonly to ex-JBIC operations which were requested to JBIC/JICA before the new JICA's Environmental and Social Considerations Guidelines officially became in effect on 1 July 2010. The ex-JBIC Guidelines are applicable for this study. The environmental and social considerations refer not only to the natural environment, but also to social issues such as involuntary resettlement and respect for the human rights of indigenous peoples.

The objective of the guidelines is to encourage project proponents seeking funding from JICA to implement appropriate environmental and social considerations in accordance with the guidelines. In doing so, it endeavours to ensure transparency, predictability and accountability in its confirmation of environmental and social considerations.

One of the basic principles of the guidelines regarding confirmation of environmental and social considerations is that the responsibility for environmental and social considerations for the project shall be that of the project proponent. JICA confirms these environmental and social considerations by undertaking screening, environmental review, and monitoring and follow-up.

Environmental and social considerations required for funded projects cover underlying principles, examination of measures, scope of impact to be examined, compliance with laws, standards and plans, social acceptability and social impacts, involuntary resettlement, indigenous peoples and monitoring.

The following are the summary of requirements under the guidelines:

- 1) Social acceptability and social impacts
 - Projects must be adequately coordinated so that they are accepted in a manner that is socially appropriate to the country and locality in which the project is planned. For projects with a potentially large environment impact, sufficient consultations with stakeholders, such as local residents, must be conducted via disclosure of information from an early stage where alternative proposals for the project plans may

be examined. The outcome of such consultations must be incorporated into the contents of the project plan; and

- Appropriate consideration must be given to vulnerable social groups, such as women, children, the elderly, the poor, and ethnic minorities who are susceptible to environmental and social impact and who may have little access to the decision-making process within society.
- 2) Involuntary resettlement
- Involuntary resettlement and loss of means of livelihood are to be avoided where feasible, exploring all viable alternatives. When, after such examination, it is proved unfeasible, effective measures to minimize impact and to compensate for losses must be agreed upon with the people who will be affected;
 - People to be resettled involuntarily and people whose means of livelihood will be hindered or lost must be sufficiently compensated and supported by project proponents, etc., in a timely manner. The project proponents, etc must make efforts to enable people affected by project, to improve their standard of living, income opportunities and production levels, or at least to restore them to pre-project levels. Measures to achieve this may include: providing land and monetary compensation for losses (to cover land and property losses), supporting the means for an alternative sustainable livelihood, and providing expenses necessary for relocation and re-establishment of community at relocation sites; and
 - Appropriate participation by the people affected and their communities must be promoted in the planning, implementation and monitoring of involuntary resettlement plans and measures against the loss of their means of livelihood.
- 3) Indigenous peoples
- When a project may have adverse impact on indigenous peoples, all of their rights in relation to land and resources must be respected in accordance with the spirit of the relevant international declarations and treaties. Efforts must be made to obtain the consent of indigenous peoples after they have been fully informed.

2.1.6 Justification for Resettlement

The project area covers approx. 564 km and 14 districts of five states where relevant railway facilities will be built for DFC development. Due to constraints of this project, such as the wide project area, the distinctive feature of the linear project, and the overall alignment policy to design the alignment in parallel to the existing railway alignment, resettlement is not fully avoidable. However, the alignment has been reviewed at the micro level by DFCCIL, and land acquisition and resettlement were minimized as described in Section 2.3 of this chapter and still being minimized by CPM offices.

2.2 SCOPE OF LAND ACQUISITION AND RESETTLEMENT

Alignment for the Western Corridor of DFC Project Phase 2 between JNPT and Vadodara and between Rewari and Dadri has been narrowed down to five states and 14 districts with 374 villages. The land acquisition is required for construction of the project along its entire length which is approximately 565 km. In general, two kinds of land will be required for this project, one within parallel including government land and the other, in detour area.

The total land to be required for the project is around 1,963.6 ha. District-wise land acquisition details are given in Table 2.2.

Table 2.2 District-wise Land Details for the Project

District	No. of Villages	Total Area (ha)
Vadodara - JNPT Section		
Raigad	39	19.3
Thane	97	192.6
Valsad	37	76.3
Navsari	22	92.2
Surat	35	160.6
Bharuch	29	243.6
Vadodara	10	114.1
Sub-total	269	898.7
Rewari - Dadri Section		
Rewari	17	119.1
Alwar	13	375.5
Mewat	19	158.5
Gurgaon	9	43.2
Palwal	8	117.1
Faridabad	28	216.8
Gautam Buddha Nagar	11	34.7
Sub-total	105	1,064.9
Total	374	1,963.6

Source: Notification 20E and Draft 20E

2.3 MEASURES TO MINIMISE LAND ACQUISITION AND LOSSES

The contents of examination of detail alternatives are same as Part II Chapter 2 Section 2.2.2.

2.4 SOCIO-ECONOMIC FEATURES OF THE PROJECT AFFECTED PERSONS

Socio-economic information was collected from PAFs through the Baseline Survey and Census. This section presents the selected socio-economic profile of PAFs/PAPs for the surveyed villages of Phase 2 section as of early March 2012, and includes partial result of Faridabad District since there are four villages which refused the Baseline Survey and Census in Faridabad District.

2.4.1 Contents of the Baseline Survey and Census Questionnaire on Socio-economic Information

Major questions of the Baseline Survey and Census questionnaire are as follows:

- 1) Occupation, family members, education level, religion, and social categories of the PAFs;
- 2) Type of affected structures;
- 3) Income source, assets including livestock, agricultural equipments, household goods, savings and loans;
- 4) Access to public facilities such as school, markets, workplace, and religious buildings; and
- 5) Perception on the expected social impacts of resettlement and compensation and/or the DFC Project itself.

2.4.2 Social Profile of PAFs/PAPs

Based on the findings of the Baseline Survey and Census, the social profile of the PAFs/PAPs such as social category, religion, income level and other socio-economic characteristics is presented in the following sections.

2.4.3 Social Category of PAFs

The social category of the whole project area shows that the majority is Other Backward Castes (6,079 families/63.1%). The second stratum of the social grouping in the area is of General Caste (2,295 families/23.8%) followed by Scheduled Tribe (662 families/6.9%) and Scheduled Caste (SC) (601 families/6.2%). The district-wise social category is presented in Table 2.3.

Table 2.3 Social Features of PAFs

District/ Section	General	OBC	SC	ST	Total Respondent HH
Raigad	144	174	24	0	342
Thane	393	4,479	315	471	5,658
Valsad	82	264	30	109	485
Navsari	168	283	36	34	521
Surat	301	33	16	23	373
Bharuch	344	83	11	8	446
Vadodara	157	27	22	5	211
Rewari	112	142	5	0	259
Alwar	23	241	43	0	307
Mewat	71	182	30	9	292
Gurgaon	66	64	3	0	133
Palwal	174	22	13	3	212
Faridabad	200	62	45	0	307
Gautam Buddh Nagar	60	23	8	0	91
Total	2,295	6,079	601	662	9,637

Source: Baseline Survey and Census, 2010-2011

2.4.4 Religious Categories of the PAFs

The project area is dominated by Hindu community as they form 90.4% (8,713 families) of the PAFs as presented in Table 2.4.

Table 2.4 Religious Categories of the PAFs

District/ Section	Hindu HH	Muslim HH	Christian HH	Jain HH	Sikh HH	Other HH	Total Respondent HH
Raigad	324	18	0	0	0	0	342
Thane	5,450	133	68	0	0	7	5,658
Valsad	469	13	0	0	0	3	485
Navsari	490	27	0	4	0	0	521
Surat	336	36	0	0	0	1	373
Bharuch	172	274	0	0	0	0	446
Vadodara	186	25	0	0	0	0	211
Rewari	259	0	0	0	0	0	259
Alwar	266	36	0	0	5	0	307
Mewat	58	234	0	0	0	0	292
Gurgaon	129	4	0	0	0	0	133
Palwal	191	20	0	1	0	0	212
Faridabad	307	0	0	0	0	0	307
G.B. Nagar	76	4	0	0	11	0	91
Total	8,713	824	68	5	16	11	9,637
Percentage	90.4%	8.6%	0.7%	0.1%	0.2%	0.1%	

Source: Baseline Survey and Census, 2010-2011

2.4.5 Vulnerable Families

The vulnerability was screened based on the definition of the vulnerable in the NRRP 2007. The NRRP 2007 defines vulnerable persons as disabled, destitute, orphans, widows, unmarried girls, abandoned women or persons above 50 years of age, who are not provided or cannot immediately be provided with alternative livelihood, and who are not otherwise covered as part of a family (para 6.4 (v), NRRP 2007).

According to the Baseline Survey and Census, the most common category of vulnerability is PAFs with elderly over 50 years old (4,207 families), followed by widow-headed PAFs (1069) and PAFs with unmarried girl (836).

Table 2.5 Vulnerability Status of PAFs

District/ Section	Total No of Households	HH with Disabled	BPL HH	Women Headed HH	Elderly over 50 Years	Widow Headed HH	HH with Unmarried Girl	HH with Abandoned Women	HH with Orphans
Raigad	342	6	0	21	73	10	105	3	0
Thane	5,658	24	81	46	2,568	443	255	14	0
Valsad	485	5	35	2	213	103	75	0	0
Navsari	521	8	19	3	141	33	28	0	0
Surat	373	7	4	0	209	59	35	0	0
Bharuch	446	9	13	0	203	79	88	1	0
Vadodara	211	4	1	0	94	45	28	0	0
Rewari	259	1	3	4	143	49	4	2	0
Alwar	307	3	1	0	176	79	11	0	1
Mewat	292	8	1	0	175	5	43	0	0
Gurgaon	133	0	0	0	49	18	13	0	0
Palwal	212	0	5	1	81	30	36	2	0
Faridabad	307	1	0	1	58	105	112	1	0
Gautam Budh Nagar	91	1	0	0	24	11	3	1	0
Total	9,637	77	163	78	4,207	1,069	836	24	1

Note: Below Poverty Line (BPL) Family: BPL families are calculated by comparing annual household income and the latest BPL threshold income figure determined by Planning Commission, Government of India (which is INR30,240 for urban households and INR 19,872 for rural households). Since some households did not provide information about their income, this is the minimum number of the BPL households in the affected area.

Source: Baseline Survey and Census, 2010-2011

2.4.6 Average Household Income

Monthly income of affected households has been summarized in Table 2.6. Overwhelming majority (635) of households whose income is INR 2,500 and below reside in Thane District. Valsad and Navsari District also have larger proportion of poorer households compared with overall average.

Table 2.6 Average Annual Family Income by Source (INR)

Sectors	No of Households	%
2,500 and below	809	8.4%
2,501 – 5,000	2,275	23.6%
5,001 – 10,000	3,211	33.3%
10,001 – 20,000	1,645	17.1%
20,001 – 50,000	989	10.3%
50,001 and above	507	5.3%
No Answer	201	2.1%
Total	9,637	100%

Source: Baseline Survey and Census, 2010-2011

2.4.7 Occupation of Surveyed PAFs

In the project area, the major sector engaged by PAFs is agriculture (3,491 PAFs/45.8%), followed by miscellaneous sector (2,827 PAFs/ 37.1%) as shown in Table 2.7.

Table 2.7 Sectors Engaged by Surveyed PAFs

Sectors	No of Households#	%	No of Members	%
Agriculture	3,491	45.8%	23,080	49.7%
Manufacturing	97	1.3%	304	0.7%
Government Service	312	4.1%	1,604	3.5%
Private Service	887	11.6%	4,796	10.3%
Misc.	2,827	37.1%	16,663	35.9%
Total	7,614	100%	46,447	100%

Note: Many of the family members are engaged in multiple sectors, but this table presents the primary sector of respective households; 25 households in Raigad and 1998 households in Thane District did not specify the sector they are primarily engaged.

Source: Baseline Survey and Census, 2010-2011

2.4.8 Educational Status of PAPs

Education level of PAPs is presented in Table 2.8. According to the Baseline Survey and Census, 8,223 PAPs are illiterate (13.4%). The majority are PAPs who completed high school (15,712 PAPs / 25.6%) followed by PAPs with primary education (14,957 PAPs / 24.4%).

Table 2.8 Educational Status of PAPs

Educational Status	Male	%	Female	%
6 years old and below	3,818	-	3,175	-
Illiterate	2,717	9.2%	5,506	22.1%
Can read	3,434	11.7%	3,296	13.2%
Can write	1,842	6.3%	1,577	6.3%
Up to Class 5 (Primary)	8,202	27.9%	6,750	27.0%
Up to Class 12 (High School)	9,788	33.3%	5,924	23.7%
Graduate	2,425	8.2%	1,566	6.3%
Professional Education	1,006	3.4%	341	1.4%
Total	33,232	100%	28,135	100%

Source: Baseline Survey and Census, 2010-2011

2.4.9 Anticipated Difficulties after Resettlement by PAFs to be Displaced

Finding a new house appears to be the most common concern among resettlers (69.7%) in terms of difficulties after resettlement.

Table 2.9 Anticipated Difficulties after Resettlement by PAFs to be Displaced

District/Section	Responded HH (Resettlers)	New Income Source	New House	New Suitable farmland	Suitable School	Access to Utilities
Raigad	137	0	72	67	0	0
Thane	2,025	331	1,532	251	84	13
Valsad	71	13	36	25	0	1
Navsari	64	13	46	14	2	0
Surat	54	15	37	28	0	1
Bharuch	1	1	0	0	0	0
Vadodara	1	0	1	1	1	0
Rewari	40	35	5	12	0	1
Alwar	16	11	1	7	0	0
Mewat	33	28	1	19	1	0
Gurgaon	14	3	4	7	0	0
Palwal	18	3	2	10	0	0
Faridabad	49	18	28	20	0	0
G.B. Nagar	6	0	0	0	6	0
Total	2,529	471	1,765	461	94	16

Source: Baseline Survey and Census, 2010-2011

2.5 RESETTLEMENT POLICY AND ENTITLEMENTS

2.5.1 Objectives of Rehabilitation and Resettlement

Recognising the adverse impacts of the project, such as the need to address the involuntary displacement and other related adverse social impacts, MOR and DFCCIL have formulated RRP including entitlements keeping in view the national laws and international guidelines i.e.: RAA 2008, NRRP 2007, and ex-JBIC Guidelines. The RRP will govern all cases of rehabilitation and resettlement due to the DFC Project. Based on this, the following core involuntary resettlement principles applicable are:

- Avoid or minimize land acquisition and involuntary resettlement impacts by exploring all viable alternative designs;
- Where displacement is unavoidable, prepare time-bound RRP for PAPs so that they are not worse off than the present socio-economic condition after the implementation of the project. In other words, assist affected persons in improving their former living standards and income earning capacity with additional assistance to vulnerable groups;
- Ensure wide range of meaningful consultations with stakeholders including likely PAPs on compensation, disclosure of resettlement information, participation of PAPs in planning and implementation of the resettlement program in order to suitably accommodate their inputs and make rehabilitation and resettlement plan more participatory and broad based;
- Facilitate harmonious relationship between the Executing Authority and PAPs through mutual co-operation and interaction;
- Ensure payment of compensation and assistance to PAPs for lost assets at replacement value as per the Entitlement Matrix;

- Ensure payment of compensation and resettlement assistance prior to taking over the possession of land and commencement of any construction activities;
- Provision of rehabilitation assistance for loss of livelihood/income; and
- Establishment of institutional arrangements such as grievance redress mechanism, NGO if required; and
- In case of linear acquisitions, in projects relating to railway lines, highways, transmission lines, laying of pipelines and other such projects wherein only a narrow stretch of land is acquired for the purpose of the project or is utilised for right of way, each *khatedar* in the affected family shall be offered by the requiring body an ex-gratia payment of such amount as the appropriate government may decide but not less than twenty thousand rupees, in addition to the compensation or any other benefits due under the Act or programme or scheme under which the land, house or other property is acquired.

2.5.2 Rehabilitation and Resettlement Policy

The resettlement and rehabilitation policy is based on the principles that the PAPs would not be worse-off on account of the project than they were before.

2.5.3 General Principles

General principles for the rehabilitation and resettlement for the Project are shown in Table 2.10.

Table 2.10 General Principles for the Rehabilitation and Resettlement for the Project

<ol style="list-style-type: none">1) PAPs/PAFs will be categorized as titleholders, non-titleholders, tenants, users of the land plot including kiosks, vendors, etc.2) The compensation and assistance will be provided as per the "Entitlement Matrix" for different categories of PAPs.3) PAPs will be assisted in improving or regaining their standard of living at project cost.4) Vulnerable PAP will be eligible for additional resettlement and rehabilitation assistance as provided in entitlement matrix.5) PAPs will receive applicable compensation for lost assets at replacement cost as per the entitlement matrix.6) PAPs not enumerated during the census shall be included in the list of PAPs based on documentary evidence.7) However, anyone moving into the project area after the cut-off date will not be entitled to assistance.8) The project will have separate resettlement budget.9) All information related to rehabilitation and resettlement policy, mitigation measures, resettlement plan preparation and implementation will be disclosed to all stakeholders including likely PAPs.10) Meaningful participation of stakeholders would be ensured at various stages of the project.11) Appropriate grievance redress mechanism will be established to ensure speedy resolution of disputes.12) Consultations carried out with stakeholders and PAPs will be documented. It will be ensured that meaningful consultations continue during the implementation of the Rehabilitation and Resettlement Plan.13) Any change in the status of title-holding/tenancy after the cut-off dates shall not be considered.

Source: DFCCIL

2.5.4 Prevention of Influx of New Encroachers and Squatters

The following measures are undertaken to prevent influx of new encroachers and squatters within the proposed ROW after the cut-off date:

- PAPs will be identified and recorded as early as possible through the Baseline Survey and Census and/or the Joint Measurement Survey.

- One of the DFCCIL officers with the rank of Executive Engineer shall be made responsible for the identification, reporting and initiation of action for eviction of encroachers and squatters that occur after the cut-off date as per the existing law. DFCCIL will carry out monitoring of the entire section under his/her jurisdiction with the help of other support staff. Monthly monitoring will be reported to senior officer in DFCCIL for further information and guidance.
- Fencing or construction of wall in the urban sections and other potential locations to prevent entry of illegal occupants in the future within the proposed ROW during the project implementation period.

2.5.5 Eligibility for Compensation/Assistance/Rehabilitation

Eligibility for compensation, assistance, and rehabilitation is shown in Table 2.11.

Table 2.11 Eligibility for Compensation, Assistance, and Rehabilitation

<ol style="list-style-type: none">1) The cut-off date for entitlement is the date on which notification is issued as per the notification prescribed under Section 20A of RAA 2008 for titleholders and non-titleholders.2) Eligibility of different categories of PAPs will be as per the Entitlement Matrix as shown in the subsequent section below.3) The unit of entitlement will be family.4) Titleholder PAPs will be eligible for compensation as well as assistance.5) Non-titleholder PAPs will not be eligible for compensation of the land occupied by them. However, they will receive applicable compensation for the investment made by them on the land such as replacement value of structures and other assets as per the Entitlement Matrix. They will also be eligible for Resettlement and Rehabilitation assistance as per Resettlement Policy and Entitlement Matrix.6) In case a PAP could not be enumerated during census, but has reliable evidence to prove his/her presence before the cut-off date in the affected zone, he/she shall be included in the list of PAPs after proper verification by the grievance redress committee.7) PAPs from vulnerable group will be entitled for additional assistance as specified in the Entitlement Matrix.8) PAPs will be entitled to take away or salvage the dismantled materials free of cost without delaying the project activities.9) If a notice for eviction has been served on a person/family before the cut-off date and the case is pending in a court of law, then the eligibility of PAP will be considered in accordance with the legal status determined by the court and the PAP will be eligible for compensation/assistance in accordance with the RRP provisions.

Source: DFCCIL

2.5.6 Compensation and Assistance

Main policy on the compensation of land acquisition for the Project is shown in Table 2.12.

Table 2.12 Main Policy on Compensation of Land Acquisition for the Project

- 1) Land acquisition will be the responsibility of the MOR as project proponent and DFCCIL as project implementation agency from the Central Government, and Competent Authority from State government authorized by the Central Government.
- 2) Additional land required for the project shall be acquired as per RAA 2008 therein from time to time.
- 3) Land will not be acquired for the project by invoking emergency clause of RAA 2008.
- 4) The compensation amount for land will be paid to the land losers as per RAA 2008.
- 5) The land acquisition will be considered complete based on the procedure prescribed under Section 20(I) of RAA 2008.
- 6) If the land losers decide to surrender residual land plot to the project DFCCIL will be bound to acquire the residual plot and pay compensation and Resettlement and Rehabilitation assistances as per provisions of the policy.
- 7) All land measurements shall be based on the latest revenue map of the concerned village.
- 8) If compensation money is not claimed by the interested persons for one year after the notice for collection of compensation amount the compensation amount will be kept with DFCCIL/CA in a separate account till the duration of the project. Interested parties either directly or through their legal heirs as the case may be can claim their compensation after satisfactory documentary verification. After project completion however, the money will be kept in the Government treasury as "unclaimed money".

Source: DFCCIL

Main items for the compensation and assistance for the Project are shown in Table 2.13.

Table 2.13 Main Items for Compensation and Assistance for the Project

- 1) Independent valuator authorized by DFCCIL will determine the replacement value of land, structures, trees and crops and other assets wherever required.
- 2) The difference between the replacement cost as determined by the independent valuator and the amount paid as compensation shall be paid as assistance by DFCCIL/CA. Thus the replacement cost is the total of compensation and assistance.
- 3) Replacement cost of structures and other assets affected shall be paid without depreciation
- 4) In case the structure is partly acquired, then cost to maintain the viability and safety of the remaining part of structure shall be taken into consideration while estimating the replacement cost.
- 5) Absentee titleholder PAPs will be eligible for compensation only.
- 6) PAPs losing source of livelihood shall be eligible for transitional allowance as specified in the Entitlement Matrix. Loss of livelihood will be verified by the DFCCIL/CA for providing transitional assistance.
- 7) PAPs losing their place of residence/business or both (displaced) shall be eligible for shifting allowance for carrying household items and transport allowance for transporting salvaged materials from dismantled structure.
- 8) PAPs losing sources of livelihood shall be eligible for cash compensation of Rs.4000/- in lieu of training to upgrade their skills (one person per affected family) at project cost.
- 9) Compensation and assistance will be paid before taking possession of the acquired land and properties.
- 10) Non-title holders shall be paid applicable compensation for structure and other assets before taking over the land for civil construction work.
- 11) Civil works will start only after the compensation and/or assistance has been paid to the PAPs.
- 12) Advance notice of appropriate period such as 3 months shall be given by DFCCIL/CA for harvesting of standing crops.
- 13) Assistance on account of damage to standing crops shall be based on the estimate provided by the Agriculture Department. Market rate of crops will be determined by DFCCIL/CA in consultation with agricultural department or procurement rate announced by the concerned government, whichever is higher.
- 14) Advance notice of appropriate period such as 3 months will be served by DFCCIL/CA to vacate encroached homestead or vacant land.

Source: DFCCIL

The compensation for rehabilitation and resettlement shall be paid as per the Entitlement Matrix.

2.5.7 Entitlement Matrix

A detailed description of compensation and assistance is given in the Entitlement Matrix as shown in Table 2.14. PAPs will be eligible for a combination of compensation and

assistance measures depending upon the nature of ownership rights of lost assets, type of impact and socio-economic status of PAPs.

Table 2.14 Entitlement Matrix for DFC Project Based on RAA 2008 and NRRP 2007

S.No	Application	Definition of Affected Persons	Entitlement	Details
A. Loss of Private Agricultural, Homestead & Commercial Land				
1	Land on the Project ROW	Legal Title holders and Affected Parties with traditional land rights	1.Compensation at replacement cost 2.Resettlement and Rehabilitation	(i) Cash compensation for the land at market value, which will be determined as mentioned in note (A) (Section 20 G of RAA 2008) (ii) 60% solarium on the compensation determined in (i) above (Section 20F(9) of RAA 2008). (iii) In case where a State Government through any act or Gazette Notification or as approved by any authority of State Government (duly authorized for the purpose) as per their approved procedure has fixed a rate for compensation of land, the same may be adopted by the Competent Authority in determining the compensation for land in lieu of (i) and (ii) above. (iv) Additional ex-gratia amount of Rs 20,000/- for those losing land up to 1,500 sqm (para 7.19 NRRP 2007); Plus Rs.15 per sqm for area acquired above 1,500 sqm (v) If as a result of land acquisition, the land holder becomes landless or is reduced to the status of a "small" or "marginal" farmer, rehabilitation assistance equivalent to 750 days of minimum agricultural wages would also be given (vi) The Competent Authority may in case of doubt/conflicting claims of compensation of market value take inputs from an independent evaluator also before deciding the award. Detailed procedure in this regard is in Note B (vii) Policy for acquisition/ compensation for residual land will be as per Note C (viii) Refund of stamp duty and registration charges incurred for replacement land to be paid by the project; replacement land must be bought within a year from the date of payment of compensation to affected party as defined in Section 20(H) of RAA 2008
2		Registered tenants, contract cultivators and leaseholders	Compensation for standing crops at market rate	Registered tenants, contract cultivators and leaseholders are not eligible for compensation for land. They will only be eligible for compensation for standing crops at market rate if 3 months' advance notice is not served by EA.
3		Un-registered tenants, contract cultivators, leaseholders, sharecroppers	Compensation for standing crops at market rate	Un-registered tenants, contract cultivators, leaseholders and sharecroppers are not eligible for compensation for land. They will only be eligible for compensation for standing crops at market rate if 3 months' advance notice is not served by EA. In case of share croppers, compensation shall be in the ratio as mutually agreed by the share croppers and land owners.

S.No	Application	Definition of Affected Persons	Entitlement	Details
B. Loss of Private Structures (Residential/Commercial)				
4	Structure on the Project ROW	Title Holder/Owner	Compensation at replacement rate Resettlement and Rehabilitation Assistance	(i) Cash compensation for the structure at replacement cost which would be determined as per Note D. (ii) Right to salvage material from the demolished structures. (iii) Three months' notice to vacate structures. (iv) Refund of stamp duty and registration charges for purchase of new alternative houses/shops at prevailing rates on the market value as determined in (i) above. Alternative houses/shops must be bought within a year from the date of payment of compensation to affected party as defined in Section 20(H) of RAA 2008. (v) Resettlement and Rehabilitation Assistance as applicable as under: (a) Transition Allowance of Rs 4,000/- per household. (b) Each affected family getting displaced shall get a one-time financial assistance of Rs 10,000 as shifting allowance (para 7.10 NRRP 2007). (c) Each affected family that is displaced and has cattle, shall get financial assistance of Rs 15,000/- for construction of cattle shed (para 7.10 NRRP 2007). (d) Each affected person who is a rural artisan, small trader or self employed person and who has been displaced shall get a one-time financial assistance of Rs 25,000/- for construction of working shed or shop (para 7.12 NRRP 2007). (e) House construction assistance for those living below poverty line equivalent to the latest construction cost of Indira Awas Yojana Scheme for Rural Areas and cost of house construction under JNURM for Urban Areas.
5	Structure on the Project ROW	Tenants/Lease Holders	Resettlement and Rehabilitation Assistance	(i) Registered lessees will be entitled to an apportionment of the compensation payable to structure owner as per applicable local laws. (ii) In case of tenants, three months written notice will be provided along with Rs 10,000 towards shifting allowance (NRRP 7.11). (iii) Three months' notice to vacate structures. In case notice is not provided, then three months' rental allowance will be provided in lieu of notice.
C. Loss of Trees & Crops				
6	Standing Trees, Crops on Project ROW	Owners and beneficiaries of land	Compensation at market value	(i) Three months' advance notice to affected parties to harvest fruits, standing crops and remove trees (ii) Compensation to be paid at the rate estimated by: (a) the Forest Department for timber trees (b) State Agriculture Extension Department for crops (c) Horticulture Department for perennial trees (d) Cash assistance to title holders and non title holders including informal settlers/ squatters for loss of trees, crops and perennials at market value

S.No	Application	Definition of Affected Persons	Entitlement	Details
D. Loss of Residential/Commercial Structures by Non Title Holders				
7	Structures on the Project ROW	Owners of structures identified as of the date of notification (20A).	Compensation at replacement cost Resettlement and Rehabilitation Assistance	(i) Encroachers (as defined in Note F) shall be given three months' notice to vacate occupied land or compensation for loss of crops or structures, if notice is not given. Cash assistance to squatters (as defined in Note F) for their structures at replacement costs which will be determined as mentioned in Note D (ii) Resettlement and Rehabilitation assistance as under: (a) Transition Allowance of Rs 4,000/- per household. (b) Shifting allowance of Rs 10,000 per household (para 7.11 NRRP 2007). (c) Assistance of Rs 15,000/- for loss of cattle shed (para 7.10 NRRP 2007). (d) If the affected party getting displaced is a rural artisan, small trader or self employed person assistance of Rs 25,000/- for construction of working shed or shop (para 7.12, NRRP 2007) (e) House construction assistance for those living below poverty line equivalent to the latest construction cost of Indira Awas Yojana Scheme for Rural Areas and cost of house construction under JNURM for Urban Areas.
E. Loss of Livelihood				
8	Households living on ROW	Title Holders/ Non-Title holders/share-croppers, agricultural labourers and employees	Rehabilitation Assistance	(i) Rehabilitation grant equivalent to 750 days of minimum agricultural wages to those families losing livelihood (para 7.14, NRRP 2007) <i>(land title holders availing assistance of 750 days minimum wages under Section 1 (v) above would not be eligible for this assistance)</i> (ii) Training Assistance of Rs 4,000/- for income generation per household (iii) Temporary employment in the project construction work to Affected Persons (APs) with particular attention to APs Below Poverty Line (BPL) by the project contractor during construction, to the extent possible
E1 Additional Support to Vulnerable Group (as defined in Note E) and those Below Poverty Line				
9	Households affected by ROW	Households affected by ROW	Resettlement and Rehabilitation Assistance	One time additional financial assistance equivalent to 300 days of minimum wages
E2 Additional Assistance to Scheduled Tribe Affected Families				
10	Affected Scheduled Tribes	Households affected by ROW	Rehabilitation Assistance	(i) Each ST affected family shall get an additional one time financial assistance equivalent to 500 days minimum agricultural wages for loss of customary right or usage of forest produce (para 7.21.5 NRRP 2007) (ii) In case of land acquisition from each ST affected family, at least one third of the compensation amount due shall be paid to the affected families at the outset as first instalment and the rest at the time of taking over the possession of the land (para 7.21.4 NRRP 2007)
F. Loss of Community Infrastructure/Common Property Resources				
11	Structures and other resources (eg land, water, access to social services etc) on ROW	Affected communities and groups	Reconstruction of community structure and common property resources	Reconstruction of community structures and replacement of common property resources in consultation with the community as appropriate

S.No	Application	Definition of Affected Persons	Entitlement	Details
G. Temporary impact during Construction				
12	Land and assets temporarily impacted during construction	Owners of land and assets	Compensation for temporary impact during construction like disruption of normal traffic, damage to adjacent parcel of land/assets due to movement of heavy machinery and plant site.	The contractor shall bear the compensation cost of any impact on structure or land due to movement of machinery during construction or establishment of construction plant. All temporary use of lands outside proposed ROW to be through written approval of the landowner and contractor. Location of construction camps by contractors should be in consultation with DFCCIL

Note A

1. Compensation would be determined by Competent Authority as per provisions in RAA 2008, Section 20 (G) which specifies the following criteria for assessing and determining the market value of the land:
 - (i) the minimum land value, if any, specified in the Indian Stamp Act, 1899 for the registration of sale deeds in the area, where the land is situated; or
 - (ii) the average of the sale price for similar type of land situated in the village or vicinity, ascertained from not less than 50% of the sale deeds registered during three years, where higher price has been paid, whichever is higher.
2. Whenever the above provisions are not applicable, the concerned State Government shall specify the floor price per unit area of the said land based on the average higher prices paid for similar type of land situated in the adjoining areas or vicinity, ascertained from not less than 50% of sale deeds registered during the preceding three years where higher price has been paid, and the competent authority may calculate the value of the land accordingly (Section 20(G) of RAA 2008 to be followed).
3. While determining the compensation amount, a competent authority or arbitrator shall also take into account the following, as per provisions in Section 20 F (8) of RAA 2008:
 - (i) Damage, if any sustained by the person interested at the time of taking possession of the land, by reason of the severing of such land from other land.
 - (ii) Damage, if any, sustained by the persons interested at the time of taking possession of the land, by reason of the acquisition injuriously affecting his other immovable property in any manner, or his earnings
 - (iii) If, in consequence of the acquisition of the land, the person interested is compelled to change his residence or place of business, the reasonable expenses, if any, incidental to such change.
4. Before assessing and determining the market value of the land being acquired, competent authority shall:
 - (i) Ascertain the intended land use category of such land; and
 - (ii) Take into account the value of the land of the intended category in the adjoining areas or vicinity.
5. In case where the right of the user or any right in the nature of an easement on, any land is acquired, an amount calculated at ten percent of the compensation amount determined under Section 20 F(1) of RAA 2008, shall be paid by the Executing Authority (EA) to the owner and any other person whose right in enjoyment of the land has been affected.

Note B

DFCCIL would also hire an Independent Evaluator registered with Government, who can assist to assess the replacement cost of land as follows and provide inputs to the competent authority:

- (i) Appraise recent sales and transfer of title deeds and registration certificates for similar type of

land in the village or urban area and vicinity

- (ii) Appraise circle rate in urban and rural areas of the district
- (iii) Appraise agricultural productivity rate for land – 20 years yield.

The Competent Authority may take inputs from the independent evaluator before deciding the compensation for the land.

Note C

If the residual plot(s) is (are) not economically viable, the EA will follow the rules and regulations applicable in the state and compensate accordingly; if there are no state specific rules and regulations available regarding residual land and if it is less than average land holding of the district after EA purchase, the EA in agreement with the Affected Party, will follow one of the following:

- i. The EA will buy the residual land for the project following the entitlements listed in the entitlement matrix; or
- ii. The EA will pay the Affected Party 25% of the land hardship compensation for that portion of land without its purchase.

Note D

The compensation for houses, buildings and other immovable properties will be determined on the basis of replacement cost by referring to relevant Basic Schedule of Rates (B.S.R) as of the date without depreciation. While considering the B.S.R, the independent evaluator registered with the Government will use the latest B.S.R for the residential and commercial structures in the urban and rural areas of the region, and in consultation with the owners

Note E

NRRP 2007 defines Vulnerable Persons as disabled, destitute, orphans, widows, unmarried girls, abandoned women or persons above 50 years of age; who are not provided or cannot immediately be provided with alternative livelihood, and who are not otherwise covered as part of a family (para 6.4 (v) NRRP 2007)

Note F

Definitions:

Marginal farmer - A cultivator with an un-irrigated land holding up to 1 hectare or with an irrigated land holding up to half hectare.

Small farmer – A cultivator with an un-irrigated land holding up to 2 hectares or with an irrigated land holding up to 1 hectare, but more than a marginal farmer.

Encroacher- A person/family, who transgresses into public land (prior to the cut of date), adjacent to his/her own land or other immovable assets and derives his/her additional source of shelter/livelihood.

Squatter – A person/family that has settled on public land without permission or has been occupying public building without authority prior to the cut-off date and is depending for his or her shelter or livelihood and has no other source of shelter or livelihood.

Source: DFCCIL

Government Resolution for the State of Maharashtra

- ✓ The Government of Maharashtra has issued a Government Resolution (GR) for the determination of rate of compensation of land for acquisition of Private Land for DFCCIL. The Committee will consist of Collector (Chairman), Special land acquisition Officer/Competent Authority (Member Secretary) and five members and will be formed to decide the rate of compensation for land to be acquired by DFC in Maharashtra state.
- ✓ To fix the rate of land, the committee may take into account Note A of the Entitlement Matrix, Section 20G of RAA 2008, and others such as the claims of PAPs, results of the Base Line Survey,

findings of the Land Market Survey Report, development potential of the nearby area and any other local factor relevant to the land prices of the subject land.

- ✓ The committee should compare the Ready Reckoner rate with sales deed rates for the same year and offer the higher rate to land owners. If the landowners do not agree with this rate then the committee may ascertain the rate acceptable to villagers and recommend the same to acquiring body (i.e. DFCCIL) in writing for approval and then the committee will finalise the rate accordingly.
- ✓ The committee shall invariably meet once in a month to decide the rates for villages under consideration. The committee, who finalized the rates of compensation for acquisition in those villages where the dedicated freight corridor has been planned in the Maharashtra State shall advise to Competent Authority for acceptance and disbursement of compensation.

2.6 RESETTLEMENT SITE

Due to the nature of the linear project, there is no resettlement where most village members are subject to the relocation; however, a small portion of village members is expected to be relocated due to residential structures affected by the Project. Considering the situation that the entire social community is not to be displaced by the Project, no resettlement site will be prepared.

2.7 INCOME RESTORATION

The development project may have an adverse impact on the income of PAP. It also has a negative impact on the socio-cultural systems of affected communities. Income Restoration to pre project-levels is an important part of rehabilitating socioeconomic and cultural system in affected communities.

To achieve this goal, the preparation of Income Restoration programme under RRP should proceed exactly as it would have for any other economic development programme. Income Restoration scheme should be designed in consultation with the affected persons and they should explicitly approve the programme.

NGOs may be engaged for resettlement and rehabilitation implementation if required otherwise, the work shall be done by a team of CPMs representatives and Social Consultants attached to SEMU. They will ensure and provide all assistance to PAPs to restore their livelihood. Detail of the benefits for income restoration is being given in Entitlement Matrix.

2.7.1 Additional Support from On-going Poverty Reduction Programs

The CPMs and their units, social consultants of SEMU and consultants working will play a pro active role to mobilize PAPs to get benefits from various central /state government schemes and ensure accessibilities to PAPs by disclosing the same at various level, i.e.: Gram Panchayat, village, district and CPMs offices also.

NGOs may be engaged if required, for resettlement and rehabilitation implementation which will assist PAPs in finding capital from various sources by forming a self help group, from a bank, from various government schemes or utilizing project assistance.

2.7.2 Steps in Income Restoration

(1) Information on Economic Activity of PAPs

Basic information on PAPs is available from the Baseline Survey and Census. Regarding information on PAPs' economic activities, the following information obtained from the Baseline Survey and Census can be utilised:

- Land based economic activity;
- Non land based economic activities; and
- Total income of PAPs from various sources.

Based on this information Income Restoration activities can be planned. Income restoration activities are of two types: short-term and long-term.

(2) Short Term Income Restoration Activities

Short term Income Restoration activities mean restoring PAPs income during periods immediately before and after relocation. Such activities will focus on the following:

- Ensure that adequate compensation is paid before relocation;
- Relocation and transit allowance; and
- Provide short term welfare grant.

(3) Long Term Income Restoration Activities

PAPs should participate in developing a range of feasible long term income restoration options. Long term options are affected by the scale of resettlement which may affect the feasibility of various non land based and land based income restoration options. The long term options are either project financed or government financed. Therefore DFCCIL officials will coordinate with government department to assure PAPs access to all schemes for improving Income Restoration services. Project financed programmes should include a specific time frame.

2.7.3 Categories of Impacts

Project induced displacement may lead to loss or diminished income for project affected persons. The main categories of impacts are as follows:

- Loss of agricultural land, partly or fully;
- Loss of commercial establishment;
- Loss of temporary commercial structure or mobile vendor (informal occupiers); and
- Loss of livelihood (commercial tenants and agricultural labours).

In project like railway construction which involves acquiring strip of lands, it is expected that impacts are not very significant in many cases. However, mitigation measures need to be planned or implemented no matter how insignificant the impacts may be.

The best way to tackle loss of farmland, partly or fully, is to help the concerned PAP to buy equivalent farmland in a nearby area using land compensation received. Land for land is the best way for income restoration. Since this is not applicable for the DFC Project, the land compensation will be paid at market value and will be sufficient for buying replacement land.

(1) Loss of Permanent Commercial Structure

The loss of permanent commercial structures is a more complicated problem since the complementary issues of retaining the present customer base is to be simultaneously tackled. There is also the problem of tenants and owners. The required mitigation would involve reconstructing commercial area in nearby areas so that present customer base is retained. Otherwise, PAPs will handle their own replacement of structures under guidance and support of DFCCIL. Since the construction involve different activities, the money can be released into two instalments through scheduled bank.

(2) Loss of Commercial Spaces

Temporary structures and mobile vendors should be given utmost importance since these involves a vulnerable section of PAPs. They also need to be given alternative space in an adjacent area for carrying on their trade or business. The temporary structure can be shifted in to new location and mobile vendor can get station there.

2.7.4 Alternative Individual Income Restoration Scheme

- 1) Following measures for Income Restoration will be taken to recover PAPs livelihood as per approved Entitlement Matrix based on RAA 2008 and NRRP 2007.
- 2) If the affected party to be displaced is a rural artisan, small trader or self employed person an assistance of Rs.25,000/- for construction of working shed or shop (para 7.12, NRRP 2007).
- 3) Rehabilitation grant equivalent to 750 days of minimum agricultural wages to those families losing livelihood (para 7.14, NRRP 2007)
- 4) Training Assistance of Rs.4,000/- for income generation per household.
- 5) Temporary employment in the project construction work for the affected persons with particular attention to PAPs below poverty line by the project contractor during construction, to the extent possible.
- 6) One time additional financial assistance equivalent to 300 days of minimum wages will be paid as an additional support for vulnerable groups to restore their income.

2.7.5 Monitoring Individual Income Restoration Scheme

The monitoring of Income Restoration schemes will be carried out along with the monitoring of other components of RRP by CPMs and their units, social consultant of SEMU and consultants under the supervision of general manager/SEMU.

2.8 INSTITUTIONAL ARRANGEMENT

DFCCIL as the project implementation agency is responsible for the overall technical aspects and execution of the Project as well as monitoring the use of loan funds and overall implementation process. DFCCIL, headed by Managing Director, will have overall responsibility for policy guidance, coordination and planning, internal monitoring and overall reporting of the Project. DFCCIL established Project Management Units (PMUs) in its divisional level for fully dedicated for the Project. The PMU will be functional for the whole Project duration.

CPM office as PMU/the field office have been already established at Mumbai, Surat, Vadodara and Noida for the Phase 2 area, and are headed by an officer of the rank of General Manager. At DFCCIL Head Office, SEMU has already been created headed by an

officer of the rank of General Manager to look after land acquisition and rehabilitation and resettlement process.

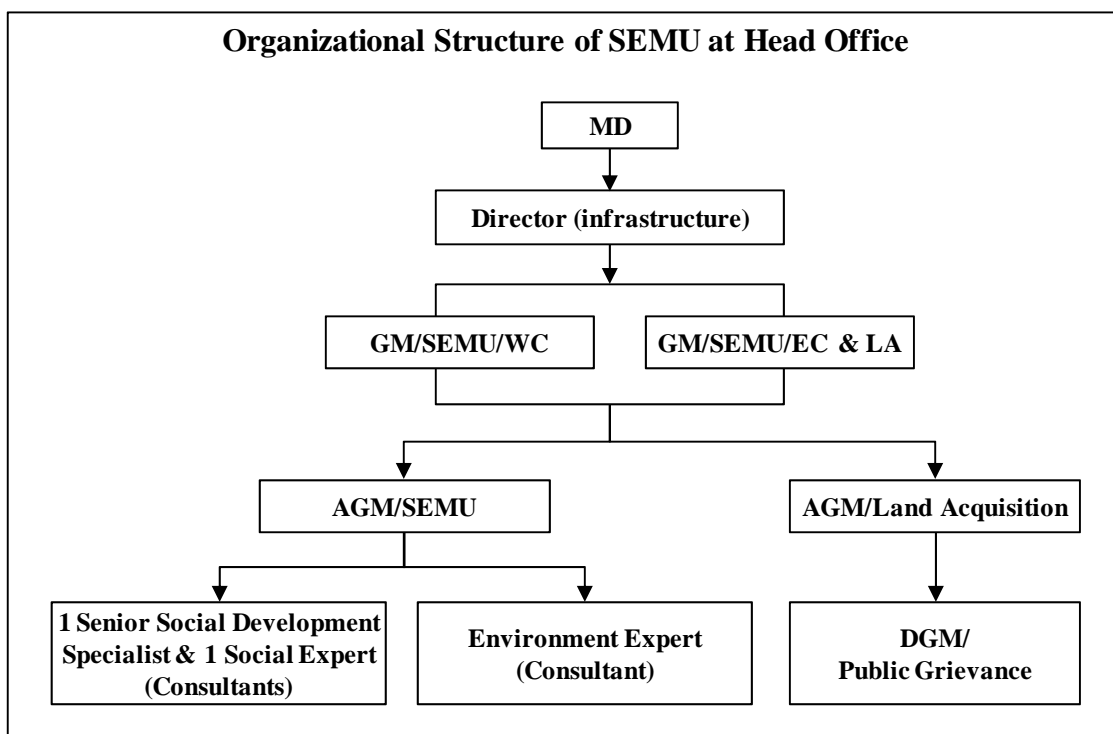
2.8.1 Resettlement and Rehabilitation Institutions at the Headquarter Level

- (1) **Managing Director (MD)**: overall responsible for successful implementation of the Project. In respect of Environment and Social Management, the specific responsibilities include the following
 - Interact regularly with SEMU and other DFCCIL engineers;
 - Participate in the policy related meetings in Railway Board on land acquisition and resettlement and rehabilitation; and
 - Ensure timely release of money to Competent Authority offices for activities included in RRP.

- (2) **Director (Infrastructure)**: is Chief Executive of the Project and is responsible for successful implementation of the various project components including RRP. In respect of RRP, specific responsibilities include the following:
 - Coordinate with the relevant state government authorities on land acquisition, resettlement and rehabilitation entitlements and other social components;
 - Report the progress in RRP implementation to MD, DFCCIL;
 - Report to Railway Board (ED, LA) about progress in land acquisition and resettlement and rehabilitation;
 - Interact regularly with SEMU staff;
 - Monitor progress of resettlement and rehabilitation with SEMU staff and field CPMs;
 - Ensure timely release of money to competent authority offices required for RRP implementation; and
 - Take up issues with MD for issues to be resolved at the Railway Board (MOR).

- (3) **Social and Environmental Management Unit (SEMU)**: Presently, the SEMU has a new General Manager for the Western Corridor (GM/SEMU/WC) who joined in December 2011 and assisted by a former GM/SEMU/WC (GM/Electric), General Manager for the Eastern Corridor/land acquisition (GM/SEMU/EC & LA), Additional General Manager (AGM/SEMU, currently vacant), Additional General Manager (land acquisition), Deputy General Manager (Public Grievance), 1 Senior Social Development Specialist in charge of the WC (consultant) and 1 Social Expert in charge of the EC (consultant) and 1 Environmental Expert (consultant) as shown in Figure 2.2. This Unit is responsible for smooth implementation of RRP. During the course of the project implementation, the SEMU will be responsible for the following:
 - Report to MD and Director (Infrastructure) about the progress in land acquisition and resettlement and rehabilitation;
 - Coordinate with the CPM offices, on the implementation of RRP;
 - Prepare formats and agree on criteria for the verification of PAFs;
 - Review individual micro plan (including rehabilitation and resettlement entitlements) prepared by the CPM offices;
 - Develop training modules for project staff and other functionaries on managing social aspects of the project;
 - Guide CPM officers in matters related to resettlement and rehabilitation;
 - Ensure budgetary provision for resettlement and rehabilitation of PAPs and relocation, rehabilitation and reconstruction of common property resources (CPRs);
 - Ensure timely release of budget for implementation of RRP; and

- Any other work that may be assigned from time to time by the higher authority.



Source: DFCCIL

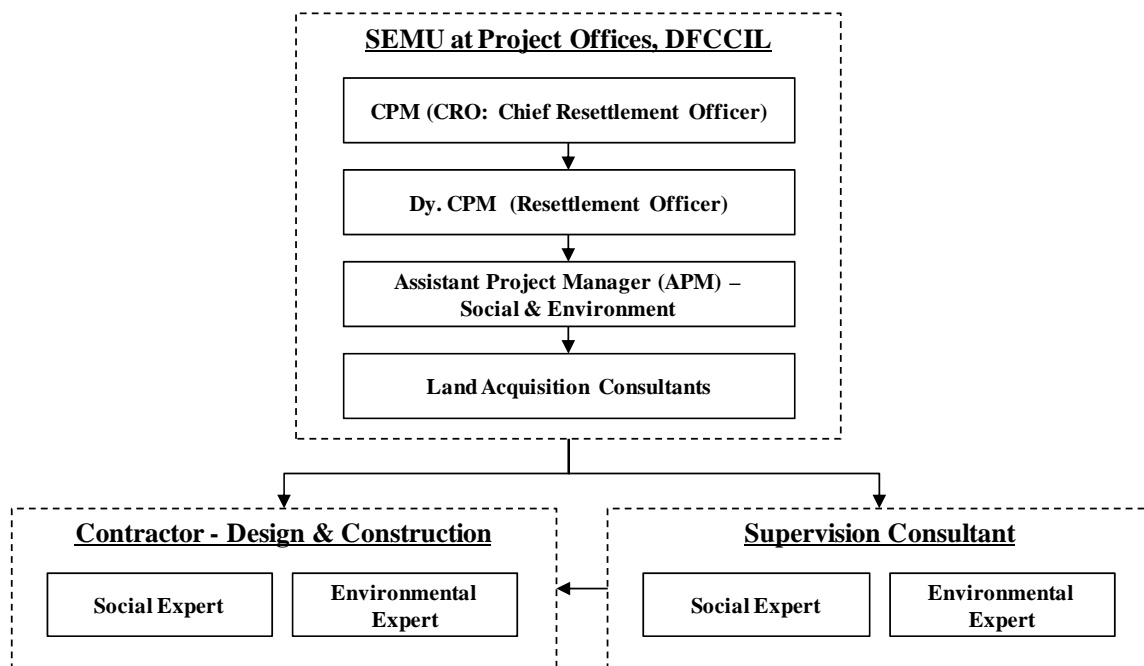
Figure 2.2 Organizational Structures for Head Office

2.8.2 Resettlement and Rehabilitation Institutions at the Field Level

The CPM assisted by Deputy Project Manager(s), Project Manager(s), Assistant Project Manager(s) (Social and Environment) and Consultants who are working in the field for performing the following duties.

- Co-ordinate with the District Administration on land acquisition and Resettlement and Rehabilitation activities;
- To have a regular interaction with the local communities to develop good working relationship;
- Disclosure of information in field offices;
- Supervise the implementation of RRP. NGO may be engaged, if required;
- Ensure the meetings on resettlement and rehabilitation policy and RRP and intensive information dissemination;
- Ensure the inclusion PAPs who could not be enumerated during census but have documentary evidence to be included in the list of PAPs;
- Develop and maintain a PAP level database including aspects related to losses, compensation, Resettlement and Rehabilitation entitlement, release of funds and utilization;
- Ensure that the resettlement and rehabilitation assistance is used for the purpose it is meant for;
- Ensure the preparation of identity cards and distribution of the same to PAPs;
- Ensure the disbursement of resettlement and rehabilitation assistance in a transparent manner;
- Participate in meetings related to resettlement and rehabilitation issues;
- Facilitate in the opening of joint account of PAPs;

- Monitor physical and financial progress of land acquisition and rehabilitation and resettlement;
- Prepare monthly progress report related to physical and financial progress of implementation of RRP;
- Ensure the release of compensation and assistance before taking over the possession of land for start of construction work;
- Ensure the relocation, rehabilitation and reconstruction of CPRs before dismantling through proper mechanism;
- Liaison with government and other agencies for inclusion of PAPs in employment and income generation programme/scheme;
- Organize fortnightly meetings with the their staffs and Competent Authority to review the progress of Resettlement and Rehabilitation;
- Sending progress report of land acquisition and rehabilitation and resettlement to Corporate Office; and
- Attend meetings and participate in Grievance Redress Committee meetings for redress of grievances of PAPs.



Source: DFCCIL

Figure 2.3 Organizational Structures for Field Office

2.8.3 Grievance Redress Committee (GRC)

In the RRP implementation, there is a need for an efficient grievance redress mechanism that will assist the PAPs in resolving queries and complaints. Therefore, the formation of Grievance Redress Committee (GRC) will be most important for grievance redress and it is anticipated that most, if not all grievances, would be settled by the GRC. CPM shall head the Grievance Redressal in his respective jurisdiction. GM/SEMU shall head the Grievance Redressal in the Corporate Office.

At the Corporate Office, the committee was established by January 2012 and comprises the following members:

- Director PP, DFCCIL;
- GM/LA & SEMU (EC), DFCCIL;

- Director Planning (Special), Railway Board, Ministry of Railways;
- DGM, Grievance, DFCCIL; and
- Senior Social Development Specialist, SEMU

2.9 IMPLEMENTATION SCHEDULE

Implementation of RRP mainly consists of land acquisition procedure, compensation to be paid for affected land and structures, rehabilitation and resettlement activities and monitoring. It is likely that the overall project will be implemented over a five years period and civil works which is likely to commence six months or so after loan approval. The civil works contract for each subproject will only be awarded after all compensation and relocation have been completed for subproject and rehabilitation measures are in place.

It is further cautioned that specific situation may require an increase in time. Such situations include, but not limited to local opposition, seasonal factors, social and economic concerns, training of support staff and financial constraints. Complementation schedule will require detailed coordination between project authorities and various line departments.

The resettlement and rehabilitation officers in the PMU and CPM offices will receive training and orientation for implementation of RRP. The local consultant/NGO which assists CPM office in RRP implementation will be trained to upgrade their skills to deliver the resettlement and rehabilitation components more effectively over time:

2.9.1 Implementation Procedure

The proposed Resettlement and Rehabilitation activities are divided into three broad categories based on the stages of work and process of implementation. The details of activities involved in these three phases, i.e. project preparation phase, RRP implementation phase, and in monitoring and evaluation period are discussed in the following sections.

2.9.2 Project Preparation Phase

The major activities to be performed in this period include; the establishment of PMU and CPM office at project and subproject level respectively; submission of detailed RRP for JICA approval; appointment of consultants and the establishment of GRC, etc. The information campaign and community consultation will be a process initiated from this stage and will go on till the end of the Project.

2.9.3 RRP Implementation Phase

After the project preparation phase the next stage is the implementation of RRP which includes

- Identification of cut-off date and notification for land acquisition as per RAA 2008 regarding land acquisition (Notification 20A);
- Verification of properties of affected persons and estimation of their type and level of losses (Joint Measurement Survey);
- Issues regarding compensation of award by DFCCIL; payment of all eligible assistance (Notification 20F);
- Preparations for relocation and rehabilitation of affected persons,
- Initiation of economic rehabilitation measures (monetary assistance, Notification 20F) and relocation and rehabilitation of the affected persons;

- Site preparation for delivering the site to contractors for construction and finally starting civil work.

2.9.4 Post Monitoring and Evaluation Phase

This section discusses only post resettlement monitoring and evaluation and does not include the monitoring during RRP implementation. It needs to be noted that the internal and external monitoring during RRP implementation is simultaneous activities and it needs to be started when land acquisition and rehabilitation and resettlement activities are started and continues until they are completed.

SEMU and CPM offices are responsible for the monitoring activities through the entire project cycle. For post monitoring and evaluation, SEMU and CPM offices need to manage and monitor the inquiries and grievances from the PAPs and if any, monitor the progress of non-monetary rehabilitation and resettlement assistance provision during construction, and monitor the impacts on selected PAPs after land acquisition and rehabilitation and resettlement activities and if any, monitor the progress of non-monetary rehabilitation and resettlement assistance provision during operation. As part of the monitoring, the periodic independent and external monitoring and evaluation shall be done by an academic institution, local consultancy or social development-related NGO which is hired for the position of Social & Environmental Safeguard Monitoring & Review Consultant (SESMRC) by the SEMU/CPM Offices in line with the Phase 1 Section/Eastern Corridor Section.

2.9.5 Resettlement and Rehabilitation Implementation Schedule

A composite implementation schedule of the RRP including various subproject and timeline matching with civil work schedule shall be prepared in further design stage of the Project. The provisional resettlement timetable is shown in Figure 2.4. However, the sequence may change or delays may occur due to circumstances beyond the control of the Project and accordingly the time can be adjusted for the implementation of the plan.

No.	Actions	2010		2011				2012				2013				2014			
		3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
1	Preparation of Land Plans																		
2	Notification under Section 20A of RAA - 2008																		
3	Hearing of Objections																		
4	Identification of Plot Owners																		
5	Notification Under Section 20E of RAA-2008																		
6	Joint Verifications (Joint Measurement Survey)																		
7	Baseline Survey and Census																		
8	Preparation of Draft RRP																		
9	Disclosure of Draft RRP																		
10	PCMs for Draft RRP																		
11	Finalization of Entitlement Matrix																		
12	Preparation of Final RRP																		
13	Disclosure of Final RRP																		
14	Preparation of Compensation for Land and R&R																		
15	Award of Compensation as per Section 20F of RAA 2008																		
16	Deposit of Money with CA																		
17	Disbursement of Payment to PAPs.																		
18	Taking possession of Land *																		
19	Execution of Work																		
20	Monitoring of Resettlement & Rehabilitation Impacts (Internal)																		
21	Monitoring of Resettlement and Rehabilitation Impacts (External, bi-annual)																		
22	Grievance Redressal																		

Note: * Execution of work will be conducted only after completion of relevant land acquisition.

Source: Draft RRP

Figure 2.4 Resettlement Timetable (Provisional)

2.10 PARTICIPATION AND CONSULTATION

2.10.1 Public Consultation Meetings on Draft RRP Report

Public Consultation Meetings for RRP (PCMs for RRP) were planned to be held by taluka for the all villages to be affected due to land acquisition and resettlement for the DFC Project. Therefore, participants of the PCMs are basically limited to the PAPs who are directly affected by land acquisition of the Project.

For Phase 2, during the Preparatory Survey, PCMs on the draft RRP was conducted twice, namely one for the fast track RRP in targeting 33 villages in Thane and Navsari Districts in June 2010 and the other for the full RRP targeting 374 villages in November 2011. The details of the methodology and outcomes are described in Chapter 3 of Part II.

2.10.2 Public Disclosure of Draft RRP Report

Public disclosure is also part of public consultation. The draft RRP were disclosed in June 2011 for the fast track RRP and between December 2011 and January 2012 for the full RRP report in the relevant target area. The objectives and methodology of public disclosure are as follows.

(1) Objectives

The objectives of disclosures are as follows:

- Dissemination of information on the draft rehabilitation and resettlement policy including Entitlement Matrix of PAFs in the Project Affected Area.
- Collection of comments and opinions from PAPs on the RRP which will be reflected in the final RRP report.

(2) Methodology of Information Disclosure of RRP

The process of information disclosure will be arranged in a systematic time bound and transparent manner ensuring widest possible public participation of the Project. The methodology of the process is given below:

- Draft RRP report in English was distributed to CPMs offices of DFCCIL, Head office of DFCCIL, Competent Authority office, District Collectorate offices, and major stations including junction stations.
- Summary of RRP especially Entitlement Matrix in a vernacular language, namely in either Hindi, Gujarati, and Marathi, was distributed to all the project affected villages including Gram Panchayat offices, District Collectorate offices, Competent Authority office, all major railway stations, CPMs offices, and Head office of DFCCIL.
- In order to facilitate proper information dissemination of availability of RRP, the public notice in a vernacular language, either Hindi, Gujarati, and Marathi, was put in the notice board of Gram Panchayat offices, District Collectorate offices, Competent Authority office, all major railway stations and CPMs offices.
- Comments and opinions were collected within approximately one week.
- Comments and opinions on the draft RRP report were accepted only in writing through direct delivery, fax, post and emails to the respective CPM offices. After collection of all comments from the CPM offices (partially by SEMU/DFCCIL) it was summarized and incorporated in the RRP report.

(3) Result of Information Disclosure of the Draft RRP

During that period, no comments were received for the fast track RRP. For the full RRP, the comments were not received by CPM Mumbai, CPM Surat, CPM Vadodara, CPM Noida, though CPM Surat received some responses due to PCMs.

2.10.3 Further Activities in Public Disclosure

Final RRP will be disclosed after incorporating the results of Baseline Survey and Census in the remaining villages in Faridabad. Methodology for disclosure will be the same as per disclosure of draft RRP report. The final RRP will be disclosed in the website of DFCCIL for public viewing.

2.11 MONITORING AND SUPERVISION

Monitoring and evaluation are critical activities toward the finalization of the process of resettlement and rehabilitation. Monitoring involves periodic checking to ascertain whether the resettlement and rehabilitation activities are in progress in helping PAPs take roots into the new resettlement areas. Evaluation is essentially a summing up of the progress of resettlement and rehabilitation at the end of the project assessing the actual achievement in comparison to those aimed at during the implementation period.

The resettlement and rehabilitation plan includes indicators and bench marks for achievement of the objectives, which includes the followings:

(1) **Process indicators**

Process of resettlement and rehabilitation which includes project inputs, expenditures, staff deployments, etc will be monitored by SEMU/DFCCIL and CPM office. DFCCIL will collect the information from the project site and assimilate in the form of monthly progress reports to assess the progress and results of the implementation of RRP. In case there was a delay or any obstacles on the implementation works, they are responsible for adjusting the work programme. The following is major items of monitoring for process indicators;

- Information campaign and consultation with PAPs;
- Status of land acquisition and payments on land compensation; and
- Resettlement of PAPs.

(2) **Output indicators**

Output indicators are as follows:

- The results in terms of numbers of affected persons compensated and resettled;
- Incomes restored; and
- Additional assistance provision.

(3) **Impact indicators**

Impact indicators are the factors related to the long-term effect of the project not only on PAFs but also on those people in the project-affected area as a whole. Field level monitoring will be carried out as follows:

- Review of census information for all PAPs;
- Consultation and informal interviews with PAPs on their up-to-date feeling about their life in the resettlement areas;
- In-depth case studies if there were any particular case worth paying special attention;
- Informal sample survey of PAPs; and
- Key informant interviews.

A proforma data sheet will be developed and used in order to carry out monitoring works at the field level.

2.11.1 **Internal Monitoring**

(1) **Objective of the Internal Monitoring**

The objective of the internal monitoring are:

- Daily operation planning

- Management and implementation
- Operational trouble shooting and feedback

(2) Information Required for Internal Monitoring

For internal monitoring the following information will be required:

- (i) Administrative Monitoring: daily planning, implementation, feedback and trouble shooting, individual PAP's database maintenance, and progress reports;
- (ii) Socio-economic Monitoring: case studies, using baseline information for comparing PAP's socio-economic conditions, evacuation, demolition, salvaging materials, morbidity and mortality, community relationships, dates for consultations, and number of appeals placed; and
- (iii) Impact Monitoring: Income standards restored/improved, and socioeconomic conditions of the affected persons. Monitoring and evaluation reports documenting progress on resettlement implementation and RRP completion reports will be provided by the CPM offices to DFCCIL Headquarter for review and approval from funding agency.

(3) Duration of Monitoring and Reporting System

DFCCIL Headquarter (SEMU) will be responsible for internal monitoring through CPM offices. It should prepare monthly reports on the progress of the implementation of RRP and adjust work program when necessary, in case of delays or any implementation problems as identified, monitoring reports will be submitted at regular intervals as specified. This monitoring will form parts of regular activity and reporting on this will be extremely important in order to undertake mid-way corrective steps.

Additionally, the consultant will be hired for the internal monitoring to provide technical assistance to SEMU such as assistance in preparing the periodic monitoring report and preparing the scope of the external monitoring during the implementation of RRP.

2.11.2 External Monitoring

Independent monitoring agency or a local consulting firm will carry out an external monitoring of the RRP.

(1) Objective of External Monitoring

The key tasks during external monitoring will include:

- Review and verification of the internal monitoring reports prepared by DFCCIL;
- Review of the Baseline Survey and Census information of pre-displaced persons;
- Identification and selection of impact indicators;
- Impact assessment through formal and informal surveys with the affected persons;
- Consultation with PAPs, officials, community leaders for preparing review report; and
- Assessment of the resettlement efficiency, effectiveness, impact and sustainability, drawing lessons for future resettlement policy formulation and planning.

(2) The Information Required for External Monitoring

The following should be considered as the basis for indicators in monitoring and evaluation of the project:

- a) Socio-economic conditions of the PAPs in the post-resettlement period;
- b) Communication and reactions from PAPs on entitlements, compensation, options, alternative developments and relocation timetables etc.;
- c) Changes in housing and income levels;
- d) Rehabilitation of informal settlers;
- e) Valuation of property;
- f) Grievance procedures;
- g) Disbursement of compensation; and
- h) Level of satisfaction of PAPs in the post resettlement period.

(3) Duration of Monitoring and Reporting System

The external monitoring will be carried out during/after the implementation of RRP is over. Financial consideration often requires an impact evaluation shortly before or after the project concludes. However, the Project continues to evolve overtime.

The periodic external monitoring will be planned and will be reported on a biannually basis to DFCCIL and funding agency.

Additionally, it is suggested that a second impact evaluation (e.g., post-resettlement external monitoring) will be carried out when land acquisition and resettlement are completed and three years after the land acquisition and resettlement are completed.

Impact evaluation will look at all the affected populations; self-relocatees, assisted resettled population, and host population. Furthermore, this larger population will be further divided into vulnerable segments. Impact evaluation will be carried out on random selected segment of population.

2.11.3 Stages of Monitoring

Considering the importance of the various stage of the project cycle, DFCCIL will handle the monitoring at each stage as stated below.

(1) Preparatory Stage

During the pre-relocation phase of the resettlement operation, DFCCIL is concerned with the monitoring of administrative issues such as, establishment of resettlement unit, budget, land acquisition, consultation with PAP's in the preparation of budgets for land acquisition and resettlement.

The key issues for monitoring are shown below:

- Consultations;
- Identification of PAP and the numbers;
- Identification of different categories of PAPs and their entitlements;
- Collection of gender disaggregated data;
- Asset inventory survey;
- Valuation of different assets;
- Budgeting;

- Information dissemination;
- Institutional arrangements; and
- Implementation schedule review, budgets and line items expenditure.

(2) Relocation and Rehabilitation Stage

Although “land for land” is not provided as per the Entitlement Matrix, PAPs will be resettled somewhere. Monitoring of DFCCIL during the relocation phase shall cover aspects such as adjustment of PAPs in the new environment, attitude of the host population towards the new comers and the development of community livelihood. The key issues for monitoring are as follows:

- Payment of compensation;
- Livelihood restoration assistance and measures (monetary);
- Relocation assistance;
- Delivery of entitlement;
- Grievance handling; and
- Consultations.

(3) Post-resettlement Stage

As previously mentioned, so-called “post-resettlement monitoring” needs to be conducted when land acquisition, resettlement and rehabilitation are completed and a few years after the completion (preferably 3 years after the completion) to assess whether the PAP are better off or worsen off by the Project. By hiring the external independent expert from a consulting firm, academic institution or NGO, evaluation of the RPP implementation needs to be conducted through the review of past monitoring reports, site visits and interviews with relevant governmental bodies, PAPs and local leaders especially paying special attention to the socially vulnerable groups and areas. The following items need to be monitored.

- PAPs’ satisfaction;
- Issues after land acquisition;
- Issues in resettlement sites;
- Livelihood levels after land acquisition and/or resettlement;
- Effectiveness of rehabilitation measures;
- Access to social infrastructure after land acquisition and/or resettlement; and
- Change in the affected community after land acquisition and/or resettlement.

2.11.4 Indicators for Monitoring

The monitoring indicators can be divided into five primary categories, which would provide insight to three types, process, output and impact. The indicators are shown in Table 2.15.

Table 2.15 Monitoring Indicators

(1) Physical Indicators
1) Extent of land acquired
2) No. of structures demolished
3) Number of land owner's and users and private structure for which owner paid compensation
4) Number of families affected
5) Number of families approaching for purchase of agricultural land
6) Number of affected person's receiving assistance or compensation
7) Number of affected persons provided with transport facilities/shifting allowance/transition allowance.
(2) Social Indicators
1) Taken care of displacement of SC, ST, Women and Vulnerable people.
2) Number of appeals placed before DFCCIL and Resettlement and Rehabilitation/Grievance Committee
(3) Economic Indicators
1) Entitlement of PAP's cash
2) Overall livelihood
(4) Grievance
1) Cases of land acquisition referred to court which are pending and settled
2) Number of the Resettlement and Rehabilitation/Grievance Committee meeting
3) Number of field visit of Rehabilitation Resettlement Officer (CPMs)
4) Number of cases disposed by Resettlement and Rehabilitation/Grievance Committee (CPM) and Headquarters) to the satisfaction of PAP's
5) Number of cases disposed by Ombudsman
6) Number of cases disposed by Arbitrator
(5) Financial Indicators
1) Amount of compensation paid for land/structure
2) Cash grant for shifting outsets
3) Cash grant for shifting cattle shed or work shed.
4) Amount paid for one time financial assistance
5) Amount paid for community structure development

Source: JICA Survey Team

2.11.5 Monitoring Project Input and Output

Project monitoring will be the responsibility of the SEMU of DFCCIL who will prepare the monthly progress reports. The report will compare the progress of the Project to the target's setup at the commencement of the Project. The list of impact performance indicators will be used to monitor project objectives. The socioeconomic survey conducted will provide the benchmarks for comparison.

2.11.6 Monitoring Form

Sample forms of the monitoring report at different stages, namely preparation and implementation period and post resettlement period, are shown in Tables 2.20-22.

Table 2.16 Monitoring Form 1: Preparation and Implementation Period

Name of village:	
Date:	
Monitoring period:	
Name of person in charge of filling this form (name of agency):	
1. Consultation with PAP	
Planned period:	Implemented period:
a) Describe the consultation activities conducted during the monitoring period:	
b) Result of the consultation (reactions, opinions, objections, etc.):	
c) Main reason(s) for delay of progress (if delayed):	
2. Agreement from PAP	
Planned period:	Implemented period:
a) Number of households who agreed to be resettled: households	
b) Main reason(s) for delay of the negotiations (if delayed):	
3. Compensation payment	
Planned period:	Implemented period:
a) Number of households who received compensation: households	
b) Main reason(s) for delay (if delayed):	
4. Relocation of PAP	
Planned period:	Implemented period:
a) Number of households already relocated: households	
b) Main reason(s) for delay (if delayed):	

Note: Monitoring for these items should be implemented from the start of the resettlement procedure to the end of all procedures of the physical resettlement with monthly frequency.
This monitoring form should be prepared for each village.
This is a guideline monitoring form which indicates the major items to be monitored. The consolidated CPM-wise monitoring forms which are more practical and user-friendly at the field level are attached in the RRP report (March 2012).

Source: JICA Survey Team

Table 2.17 Monitoring Form 2: Land Acquisition and Resettlement (Preparation and Implementation Period)

Jurisdiction	Date	Land to be acquired (ha)	No of affected Household /Commercial Structures/Common Property	Land already acquired (ha)	Household/Commercial Structures/. Common Property already relocated	Land remaining to be acquired (ha)	Household/Commercial Structures/. Common Property to be relocated	Payment Status	Expected date of completion
CPM Jaipur									
CPM Ajmer									
CPM Ahmadabad									
CPM Vadodara									

1. Land acquisition	
Planned completion date:	Actual completion date:
Main reason(s) for delay (if delayed):	
2. Relocation Status of Common Property Resources	
Planned period:	Actual completion date
a) Water facilities b) School c) Health centre d) Social hall e) Access road f) Cultural Centre g) Main reason(s) for delay (if delayed)	
3. Compensation payment	
Planned completion date:	Actual completion date:
Main reason(s) for delay (if delayed):	
4. Relocation of PAPs	
Planned completion date:	Actual completion date:
Main reason(s) for delay (if delayed):	

Note: This is a guideline monitoring form which indicates the major items to be monitored. The consolidated CPM-wise monitoring forms which are more practical and user-friendly at the field level are attached in the RRP report (March 2012).

Source: JICA Survey Team

Table 2.18 Monitoring Form 3: Post-Resettlement Period

Name of village:				
Date:				
Monitoring period:				
Name of person in charge of filling this form (name of agency):				
1. Status of livelihood				
1) Income restoration				
a) Average income: (Before resettlement:) (Previous data:)				
b) Number/Rate of households whose income are reduced:			household(s)/%	
(Previous data:)			household(s)/%	
c) Reason and proposed countermeasures (if b) increased):				
d) Prospects in near future:				
2) Occupation				
a) Number/Rate of households who changed their occupation or work place due to the resettlement: household(s)/% (Previous data: household(s)/%)				
b) Reason and proposed countermeasures (if a) increased):				
d) Average income of those who changed their occupation or work place due to the resettlement: (Previous data:)				
c) Prospects in near future:				
2. Living condition				
1) Perceptions of change in well-being				
a) Overall living conditions as compared to original one:				
- Better: % (Previous data: %)				
- Worse: % (Previous data: %)				
- No change: % (Previous data: %)				
b) Feeling toward public services and social infrastructure (with previous data):				
	Better (%)	Worse (%)	No change (%)	Remarks
Housing				
Water				
Electricity				
Transport services				
Schools				
Health center				
Religious worship				
Purchasing basic goods				
Peace and security				
Others (specify)				
b) Other remarkable changes in living conditions:				
c) Reason and proposed countermeasures (if high rate of dissatisfaction is observed):				
d) Prospects in near future:				

Note: The above monitoring should be implemented from the end of the relocation activity to the time when minimization of negative impact by the Project is confirmed in terms of situation of the employment and income restoration with semi-quarterly frequency, in principle.

This monitoring form should be prepared for each village.

Source: JICA Survey Team

2.12 GRIEVANCE REDRESS MECHANISM

There is a provision for a redress of grievances of PAFs relating to the application of the Entitlement Matrix with respect to land acquisition and rehabilitation. There shall be a Resettlement/Grievance Committees at the field and headquarters to hear and redress any grievances made by PAP/PAFs and any other local residents having a stake in the DFC Project implementation process, as per Section 8.1 of NRRP, 2007.

2.12.1 Grievance Redress at the Field Level

There shall be a Resettlement and Rehabilitation/Grievance Committee convened by the CPM, which will comprise the following:

- District Collector of the concerned District, or his nominee (Chair);
- Deputy-Chief Project Manager-DFC;
- Concerned Competent Authority/Administrator (Resettlement and Rehabilitation);
- Concerned Assistant Project Manager-Social;
- Zillah Parishad Chairperson/his nominee and
- Member of facilitating NGO.

2.12.2 Grievance Redress at Project Level

As mentioned in the previous Section of 2.8 Grievance Redress at the project level (at the Corporate Office) was established by January 2012.

2.12.3 Role of Arbitrator

The Arbitrator, who in this case is the Commissioner of the concerned revenue division have been duly appointed vide gazette dated July 15, 2010 to hear and redress grievances related to compensation payable under RAA, 2008 to the PAFs.

2.12.4 Ombudsman

An ombudsman will be appointed by the MOR to hear and resolve grievances not addressed by the Resettlement and Rehabilitation/Grievance Committees established by DFCCIL to the satisfaction of the concerned PAP/PAF upon receipt of request from him/her.

2.12.5 Meeting and Decision Making Process of the Committee

If the representation pertains to the compensation for agricultural land and homestead land property, the representation shall be forwarded to the Field Level Cell (FLC) for relating the same to Headquarter Level Cell (HLC) for resolution. If the representation pertains to family level allowances and benefits, the FLC will verify the submitted documents and conduct a field check and after validating the information provided, will decide on the representation. If the representation is found to be genuine, then the FLC level will try to resolve the case with the support of Competent Authority. If it can not be solved by FLC, it would be escalated to the HLC for resolution. If the representation is incorrect or found to be lacking in documentary evidence, the case would be rejected and the decision would be conveyed to the HLC and ombudsman.

It is suggested that Resettlement and Rehabilitation/Grievance Committee at FLC and Competent Authority from State Government shall meet regularly (at least once a month)

on a prefixed date (preferably on first the 7th day of the month). The committee will fix responsibilities to implement the decisions of the committee. This will not only help proper assessment of the situation but also suggestive corrective measures at the field level itself. The committee shall deliver its decision within 30 days of the case registration.

At the HLC, land acquisition and R& R related complaint will be handled by DGM-public grievances under GM/SEMU and AGM-land. If any grievances are not solved, the case will be submitted to higher authority

2.12.6 Complaint Handling System at DFC Field Level and Corporate Level

(1) Field Level Complaint Handling System

The complaints/grievances regarding compensation for agricultural land, residential and commercial properties and others will be handled by the CPM offices initially. After verification of documents if it is found genuine any complaints will be solved at the CPM level only. If it is not solved at the field level, it will be referred to HQ.

(2) Corporate Level Complaint Handling System

A centralized complaint handling system, which includes maintaining a project log and filing to monitor status of follow up of each received complaints, will be established by DFCCIL.

Complaint handling system has been established in terms of MOR & Central Vigilance Commission (CVC) guidelines. Complaint registers have been opened at each regional office and with each GGM/GM at Corporate office. All complaints received by the concerned office shall be put into register. Complaints having vigilance angle shall be marked to Chief Vigilance Officer (CVO) by the concerned officer. GM/IT has been nominated as the Chief Complaint Handling Officer to monitor the disposal of complaints received and put up the status to the Board of Directors on monthly basis.

Recording and appropriate referral of all incoming grievances or complaints will be undertaken by DFCCIL with each case generating an automatic, standard format report. DFC will respond to all complaints, received from any source, normally within fifteen days of receipt.

Comments, suggestions and grievances handling component is included on the website¹ (<http://www.dfccil.org>). This will be updated on a monthly basis. The site will also enable online tracking of complaints by the complainants.

Tracking of the status of investigations and measures taken will be reported in monthly reports to management.

For the complaint mechanism to function efficiently, the information concerning the alternative conduits for complaint shall be widely publicized on the website and on information boards at work sites and regional offices.

DFCCIL's website on vigilance:

http://dfccil.org/wps/portal!/ut/p/c1/04_SB8K8xLLM9MSSzPy8xBz9CP0os3iT0JAAQ09LYwMD3zBHA08Dp0A_MzdnYwtDI6B8pFm8gYWRr6-Psae7s4G7p6eXiamPoQEEENAdDrIPv36wPA7gaKDv55Gfm6pfkBthkGXiqAgALIWn9Q!!/dl2/d1/L0lDU0IKSWdra0EhIS9JTlJBQUlpQ2dBek15cUEhL11CSkoxTkExTkk1MC13ISEvN180VVRQMUK5MzAwTVZBMEkwQIFONkZDMzhIMA!!/?WCM_PORTLET=PC_7_4UTP1I9300MVA0I0BQN6FC38H0_WCM&WCM_GLOBAL_CONTEXT=/wps/wcm/connect/DFCCLibrary/DFCCIL/Others/Vigilance

2.13 COST ESTIMATE

The provisional estimated budget was prepared based on the existing data and the cost estimate of the Resettlement Action Plan of the Eastern Corridor (March 2011). However, it needs to be updated when the Baseline Survey and Census is completed in 4 villages in Faridabad District.

Table 2.19 Provisional Cost Estimate

Sl.No.	Item	Unit Cost (INR)		Quantity in ha	Sub-total in INR million	Remarks
		Stamp Duty Rate/ha in INR million	Rate incl. 60% Solatium in INR million			
A. Land Acquisition Cost						-
1	Compensation for Loss of Agricultural Land as per current Market Price - Agricultural Land Rate/ha	-	-	2,252.21	89,750	Overall, the majority of affected land is considered agricultural land. Thus, agricultural land rate was used in the cost estimate.
1-1	Raigad	80.60	129.0	73.95	9,537	(1) The cost estimate includes both the private and public land to be acquired/transferred. (2) The higher land compensation rate of Hanryana State is adopted for Rewari and Faridabad district only as per Haryana Government Revenue & Disaster Management Department Notification (11 Aug. 2011) since the remaining areas, the stamp duty rates are higher than these of the state legislation. (3) The higher compensation rate of INR129million/ha for Raigad and Thane districts was estimated based on the land market value survey results of Thane district (there is no Raigad district data).
1-2	Thane	80.60	129.0	368.27	47,492	
1-3	Valsad	1.57	2.5	90.83	228	
1-4	Navsari	4.61	7.4	65.02	480	
1-5	Surat	19.08	30.5	248.39	7,583	
1-6	Bharuch	4.57	7.3	329.97	2,413	
1-7	Vadodara	2.27	3.6	134.02	487	
1-8	Rewari	6.18	9.9	126.51	1,250	
1-9	Alwar	4.81	7.7	94.79	730	
1-10	Mewat	8.25	13.2	158.64	2,094	
1-11	Gurgaon	13.59	21.7	75.18	1,635	
1-12	Palwal	6.14	9.8	128.93	1,267	
1-13	Faridabad	7.41	11.9	255.24	3,027	
1-14	GB Nagar	7.07	11.3	102.47	1,159	
2	Additional ex-gratia of INR 20,000 for those losing land up to 15,000m2	0.02	-	2,487.45	50	Thumb rule-No of titleholders as per the 20E/draft 20E/PAP list * 12.5%
3	Additional ex-gratia @ INR15/m2 above 1500m2.	0.000015	-	2,487.45	0.037	Thumb rule-No of titleholders as per the 20E/draft 20E/PAP list * 12.5%
4	Refund of Stamp Duty and Registration Charges @ 13%	-	-	-	10,319	Thumb rule -100% of affected land
B. Compensation for Structures and Other Assets		-	-	No of PAFs	952	
5	Replacement Cost of Structures (titleholders)	0.350	-	867	303	Average cost/family was calculated based on the cost of RAP for the Eastern Corridor.
6	Replacement Cost of Structures (non-titleholders)	0.325	-	1,662	539	Average cost/family was calculated based on the cost of RAP for the Eastern Corridor.
8	Refund of Stamp Duty @13%	-	-	-	110	
C. Assistance to PAFs		-	-	No of	2,433	
9	Transition Allowance of INR4,000/household	0.004	-	19,900	80	70% of the titleholders listed in 20E, draft 20E or PAP list
10	Shifting Allowance of INR10,000/family	0.010	-	19,900	199	70% of the titleholders listed in 20E, draft 20E or PAP list
11	Training Assistance of INR4,000/family	0.004	-	19,900	80	70% of the titleholders listed in 20E, draft 20E or PAP list
12	Financial Assistance of Cattle Shed of INR15,000	0.015	-	9,950	149	Thumb rule-No of titleholders as per the 20E/draft 20E/PAP list * 50%, the rate as per the budget of the RAP for the Eastern Corridor
13	Financial Assistance for Rural Artisan, Small Trader, self-employed Person of INR25,000	0.025	-	7,960	199	No of titleholders as per the 20E/draft 20E/PAP list * 40% - as per the Baseline Survey and Census
14	Rehabilitation Assistance for Worse-off farmers (landless, small or marginal) of min agricultural wage * 750 days	0.075	-	9,950	746	Thumb rule-No of titleholders as per the 20E/draft 20E/PAP list * 50%
15	Rehabilitation Assistance for PAPs losing livelihood of min agricultural wage * 750 days but not receiving Item 14	0.075	-	9,950	746	Unit rate as per the budget of the RAP for the Eastern Corridor
16	R&R Assistance for Vulnerables of Min Wage * 300 days	0.030	-	6,454	194	Unit rate as per the budget of the RAP for the Eastern Corridor and the number of vulnerables as per the Baseline Survey and Census.
17	House Construction Assistance for BPL of min wage *300 days	0.045	-	163	7	Unit rate as per the budget of the RAP for the Eastern Corridor and the number of BPL as per the Baseline Survey and Census.
18	Financial Assistance for ST Min. Agri. Wage * 500 days	0.050	-	662	33	Unit rate as per the budget of the RAP for the Eastern Corridor and the number of ST as per the Baseline Survey and Census.
D. Compensation for Common Property Resources		-	-		26	
19	Relocation of CPR	0.350	-	59	21	
20	Compensation for Loss of Irrigation Water Source of INR50,000	0.050	-	113	6	Thumb rule - 5% of affected land. INR50,000/ha
Sub Total (A+B+C+D+E)		-	-	-	93,161	
E	Contingency (10% of Resettlement and Rehabilitation Cost)	-	-	-	9,316	Standing Crops, Trees, Supporting Costs for Implementation of RRP, Monitoring and PCMs
Grand Total		-	-	-	102,477	

All land rates are stamp duty rates (Year 2010-2011) obtained from relevant government sources for respective districts and states. For Rajasthan, land rates are of 2009, thus projected to 2011 rates following standard practice of rate enhancement @10% per annum.

All land units are converted to either ha or acre of m2 from sq yard. In case of Rajasthan the land rates are available in Bihga which is converted to ha. For Maharashtra, the average highest rates have been taken due to land rate variability within small matter,

Thumb Rules are considered based on assumptions of impact on land as experienced in linear infrastructure development projects in India.

Thumb Rules are considered based on assumptions of average cost of agriculture/irrigation in the region.

The highest stamp duty rates have been considered for each village of each affected districts following PAPs' suggestions received during RRP-PCM.

Average land rate of each district is considered as the land unit cost for the affected district.

Source: JICA Survey Team

2.14 FURTHER ACTIVITIES

Following activities need to be conducted to finalize the RRP and/or after the RRP preparation through land acquisition process based on the RRP. Main items required for further activities and arrangements for the Phase 2 RRP are discussed below.

- (1) The Baseline Survey and Census is still in progress due to public unrest in four villages in Faridabad District (i.e. Pahaladpur, Fatehpur Billoch, Ladauli, and Bahbalpur Villages in Faridabad District) as of early March 2012. After the field work is completed, the survey data shall be incorporated in the RRP accordingly (i.e. the survey period, survey results, cost estimate, schedule of land acquisition and rehabilitation and resettlement). As for the remaining survey, if the project timeline allows, the field survey shall be conducted as much as possible to cover the maximum number of PAFs so that more accurate pictures of PAFs can be captured in order to avoid any confusion in the later implementation and monitoring stages such as when compensation is awarded and when the future monitoring is conducted.
- (2) As a resettlement and rehabilitation assistance, provision of a job to the affected PAP needs to be considered because it is also one of the major requests from PAPs identified in the PCMs and there is a series of MOR's official documents on its website regarding the job provision to PAP families;
- (3) Information disclosure of the final RRP shall be conducted after finalising of the RRP;
- (4) Further public consultation shall be organised continuously until land acquisition and rehabilitation and resettlement are completed. There seems to be some confusion on the compensation and assistance amongst PAPs, which is very common in other projects, since the compensation issue is very complicated. Therefore, the continuous public consultation is required especially at the CPM level to clarify any issues raised by the PAPs and shall be recorded by the CPM offices and DFCCIL Corporate office until the land acquisition is completed. In fact, in some villages, CPM offices have been having casual/informal consultation meetings on land acquisition and resettlement and rehabilitation issues, although they were not recorded. It is suggested that in the future, any meeting with PAFs shall be recorded since they are also part of public consultation and needed to be monitored; and
- (5) Finally, since the official land acquisition process has been started for Phase 2 (e.g. 20A, 20E and 20F issuance), the activities and institutional arrangement proposed in the RRP for the implementation stage needs to be reviewed and conducted/secured. Major activities to be reviewed are as follows:
 - Although the internal monitoring has been done internally by CPM offices and SEMU, the internal monitoring needs to be done in accordance with the agreement between DFCCIL/MOR and JICA. Namely, the monitoring of land acquisition and resettlement and rehabilitation progress by village was requested by JICA in the past, and the relevant data including the copy of 20F needs to be available at Corporate Office as well.
 - Complaints and official objections records shall be shared by relevant organisations, namely CA, CPMs and DFCCIL Corporate office. Although CA is fully responsible for complaints and official objections regarding land acquisition and compensation, DFCCIL (both Corporate Office and CPMs) need to track them

as the project proponent and the data shall be available at DFCCIL since they are also subject to the internal and external monitoring required by JICA.

- Current institutional arrangement for SEMU's tasks needs to be reviewed. For instance, there is a vacancy for AGM/SEMU. The grievance redress was established at Corporate Office but not at the field level. Moreover, an ombudsman which was proposed in the RAP for the Eastern Corridor (March 2011) is not established yet.
- Institutional arrangement for SEMU's tasks at CPM offices needs to be improved, and an adequate number of staff needs to be secured especially for on-going land acquisition procedure. If necessary, an experienced local NGO specialised in resettlement and rehabilitation and/or community development could be hired to manage activities of land acquisition and rehabilitation and resettlement work and its record keeping at CPM offices.
- The external monitoring shall be done in accordance with the agreement with JICA by hiring the external agency.

CHAPTER 3 ASSISTANCE FOR PUBLIC CONSULTATION MEETING FOR RRP (PCM FOR RRP)

3.1 INTRODUCTION

In the process of finalizing the RRP, PCM plays an essential role in disclosing RRP policy framework to the stakeholders and having input and comments from participants in order to integrate the important issues into RRP. To that end, the JST assisted DFCCIL with holding a total of six PCMs for the fast track RRP in June 2011, inviting PAPs from 29 villages where the 20E Notification was about to lapse and a total of 36¹ PCMs for the full RRP in November 2011, inviting PAPs from 374 villages to be affected due to land acquisition and resettlement by the Project. The JST's assistance to DFCCIL extended throughout preparation, implementation and analysis stages of the PCM as described in the following section.

3.2 PREPARATION

3.2.1 Selection of the Venue

Since it is not feasible to conduct the PCM in each village under the limited time and resources, PCMs were organised taluka-wise in principle, and representatives from the families affected by the project's land acquisition were invited. In addition, smaller scale consultations called village meetings (VMs) were organized for villages that require special consideration, i.e. having high concentration of socially vulnerable people and non-titleholders, or being sensitive villages². The venues for each PCM were selected, with consultation from CPM offices, by considering various aspects such as physical locations and accessibility to public transportation. The main criteria for particular venue selection for conducting PCMs were the following.

- i) A PCM was organized for several villages by considering distance from villages as well as accessibility to public transportation so that people from distant villages can also attend these meetings.
- ii) Since the Competent Authorities are working for the land acquisition process, a venue was selected by considering the jurisdiction of the CA.
- iii) Availability of meeting halls and other logistics related to facilities were also considered.

3.2.2 Preparation and Distribution of the Invitation Letters and Notices

All invitation letters and notices were drafted by JST. Invitees and contents of these letters and notices were confirmed by DFCCIL. For the fast track RRP PCMs, invitation letters were delivered by the local consultant; however, for the full RRP PCMs, respective CPM offices took charge in the delivery and distribution of all the letters and notices.

As for the district authorities, all the Chief Secretaries of the states of Maharashtra, Gujarat, Rajasthan, Haryana and Uttar Pradesh were informed about the schedule of the meetings. The CA of the concerned districts as well as the District Collectors were requested for their or subordinate's presence in the meetings. The concerned railway division heads and stations superintendents were also informed the schedule of the meetings.

¹ This includes one village meeting.

² Sensitive villages mean the villages that refuse the Baseline Survey and Census.

The letters and notices to villages were translated in vernacular languages by concerned CPM offices, i.e.: Gujarati by the CPM Surat office, Hindi by the CPM Noida office and Marathi by the CPM Mumbai office. The letters were distributed to the village head/panchayat offices, and notices were posted on notice boards in respective village administrative offices and several prominent community places such as markets and schools as well. All the letters and notices were delivered or distributed at least seven days before the meetings.

3.2.3 Preparation of the Contents of the PCM

The Power Point presentation materials and hand-out in English language were prepared by the JST. In principle, both the presentation and hand-out explained the Project as well as contents of the Entitlement Matrix for the DFC Project, which was prepared based on the current policies in India on land acquisition and resettlement, namely, RAA 2008 and NRRP 2007. After the materials in English were approved by the DFCCIL, respective CPM offices translated them in vernacular languages, i.e.: Marathi by the CPM Mumbai office, Gujarati by the CPM Surat office and Hindi by the CPM Noida office. The copies of these materials used for the PCMs are attached in Attachment III.3.1.

3.2.4 Additional Preparation of Q&A Paper for Full RRP PCMs

One of the lessons learned from previous PCMs for Phase I SAPROF, Phase II ESIA and for the fast track RRP was that some of the answers given by the officers to PAPs' questions at the PCMs were inconsistent or uncertain. To avoid that problem, the JST suggested that a Questions and Answers (Q&A) paper be created in order for CPM officers to give proper, standardized and consistent answers to PAPs. The Q&A paper was a collection of anticipated frequently-asked and/or difficult-to-answer questions that were raised in past PCMs as well as suggested answers for those questions. The contents were prepared by the JST and SEMU of DFCCIL. The Q&A paper was examined by CPM officers prior to the PCMs (see Attachment III.3.2), used at the preparatory workshop as well as used at the PCMs.

3.2.5 Additional Preparatory Workshop for Full RRP PCMs

The preparatory workshops, aiming to confirm the preparedness and also to increase the awareness among CPM officers, were held at three CPM offices; on November 8 at CPM Vadodara Office, on November 9 at CPM Surat Office and on November 11 at CPM Noida Office. The workshop started with confirmation of the preparation status, i.e., delivery of invitation letters and notices, booking of venues, etc. Review of PCM agenda and hand-out, then rehearsal of PowerPoint presentation in vernacular language followed. Finally, Q&A paper prepared by the JST and SEMU of DFCCIL, as mentioned above, was read through and studied by the participating CPM officers. All the preparatory workshops were attended by CPM officers, who would take part in the PCMs, as well as the JST members, field coordinators and presenters. Indeed, the workshops brought more ownership and awareness among CPM officers. It also contributed in building team spirit among participants.

Similar meeting was held at CPM Mumbai office, on November 15, where PCMs were organized through a local NGO without direct involvement of JST. A JST expert attended the meeting as an observer and shared what JST had done at the preparation stage with them.

3.3 IMPLEMENTATION

3.3.1 Program Schedule and Agenda for Fast Track RRP PCMs

Six PCMs for the fast track RRP were scheduled to be held between June 9 and 13, 2011 in two CPM jurisdictions. The target taluka, venue, date and time of the PCM are described in the table below, followed by the agenda of the PCM.

Table 3.1 Schedule of the PCMs for the Fast Track RRP

	Village	District/ State	Date/ Starting Time	No. of Invited Villages	Invited Villages	CPM
1	Billimora	Navsari, Gujarat	Jun. 9, 2011 10:00	1	Billimora	Surat
2	Dahanu	Thane, Maharashtra	Jun. 9, 2011 11:15	11	Patilpada, Junnrarpada, Waki, Pale, Aagwan, Sarawali, Nandore, Dahanu, Kasara, Ambewadi, and Wangaon	Mumbai
3	Birwari	Thane, Maharashtra	Jun. 9, 2011 17:00	4	Birwadi, Gothanpur, Ranishirgaon, and Panchali	Mumbai
4	Dongripada	Thane, Maharashtra	Jun. 10, 2011 16:30	4	Shilottar, Sasunavghar, Sarjamori, and Mori	Mumbai
5	Kalwar	Thane, Maharashtra	Jun. 10, 2011 10:30	6	Pimpalner, Wadghar, Wadunavghar, Ovali, Rahanal, and Kalwar	Mumbai
6	Gaodevi	Thane, Maharashtra	Jun. 13, 2011 16:30	3	Juni Dombivali, Navgaon, and Gaodevi	Mumbai

Source: JICA Survey Team

Agenda

- 1) Registration of the participants
- 2) Distribution of handout, feedback form, writing pad and pen to the participants
- 3) Welcome address to the participants by a representative of the CPM offices of DFCCIL
- 4) Introduction of the DFCCIL and Railway officials present in the PCM to the participants
- 5) Introduction of Competent Authority, wherever present, to the participants
- 6) PowerPoint presentation on Draft RRP using laptop and projector on the project brief, relevant legislation, land acquisition process, compensation package, and grievance redress system, further information and contact of relevant organisations
- 7) Distribution of drinks and snacks
- 8) Question and Answer session in which the questions raised by the participants are answered directly by the DFCCIL officials and the Competent Authority
- 9) Assistance in filling up of the feedback forms upon request by the participants and collection of distributed feedback form.
- 10) Vote of Thanks

In the implementation stage, assistance for setting up the venue, registering the participants, preparing and distributing the hand-outs, stationery and refreshments, giving presentation as well as facilitating PCM were given by JST. In addition, at the PCM, JST Indian experts occasionally assisted CPM officers or CA officers by giving supplemental explanation and information to PAPs as well as by calming PAPs agitation, whenever necessary.

3.3.2 Program Schedule and Agenda for Full RRP PCMs

Thirty-five PCMs and one village meeting for RRP were scheduled to be held between the November 14 and 26, 2011 in four CPM jurisdictions. The target taluk, venue, date and time of the PCM are described in Table 3.2, followed by the agenda of the PCM.

Table 3.2 Schedule of the PCMs for Full RRP

	Taluk / Tahsil	District/ State	Date/ Starting Time	No. of Invited Villages	Venue	CPM
1	Rewari 1	Rewari, Haryana	Nov. 14, 2011 10:30	10	Yaduvansh Vatika Community Hall, Rewari	Noida
2	Rewari 2	Rewari, Haryana	Nov. 15, 2011 10:30	7	Yaduvansh Sabha Sthal, Rewari	Noida
3	Tijara	Alwar, Rajasthan	Nov. 15, 2011 15:30	13	Hotel Rajasthan heritage, Tapukera	Noida
4	Taoru 1	Mewat, Haryana	Nov. 17, 2011 10:30	11	Chandrawati B.Ed. College, Taoru	Noida
5	Taoru 2	Mewat, Haryana	Nov. 18, 2011 10:30	14	Chandrawati B.Ed. College, Taoru	Noida
6	Nuh	Mewat, Haryana	Nov. 16, 2011 10:30	3	Chandrawati B.Ed. College, Taoru	Noida
7	Sohna	Gurgaon, Haryana	Nov. 16, 2011 15:30	9	Punjabi Dharamshala, Sohna	Noida
8	Palwal 1	Palwal, Haryana	Nov. 23, 2011 10:30	4	Abhinandan Banquet Hall, New Colony	Noida
9	Palwal 2	Palwal, Haryana	Nov. 24, 2011 10:30	4	Abhinandan Banquet Hall, New Colony	Noida
10	Ballabgarh	Faridabad, Haryana	Nov. 23, 2011 15:30	5	Krishi Bhawan, Ballabhbarh	Noida
11	Faridabad	Faridabad, Haryana	Nov. 25, 2011 10:30	19	Krishi Bhawan, Ballabhbarh	Noida
12	Sadar	G.B Nagar, Uttar Pradesh	Nov. 21, 2011 10:30	11	Barat Ghar, Gulaoli, Greater Noida	Noida
13	4 villages (VM)	Faridabad, Haryana	Nov. 25, 2011 15:30	4	Panchayat Bhawan, Fathehpur Billoch	Noida
14	Olpad	Surat, Gujarat	Nov. 14, 2011 11:00	6	Manibhai Marriage Hall, Sayan	Vadodara
15	Mangrol	Surat, Gujarat	Nov. 15, 2011 11:00	4	Manibhai Marriage Hall, Sayan	Vadodara
16	Amod	Bharuch, Gujarat	Nov. 16, 2011 11:00	7	Panchbati Rajput Chhatralaya, Bharuch	Vadodara
17	Bharuch 1	Bharuch, Gujarat	Nov. 17, 2011 11:00	5	Panchbati Rajput Chhatralaya, Bharuch	Vadodara
18	Bharuch 2	Bharuch, Gujarat	Nov. 18, 2011 11:00	7	Panchbati Rajput Chhatralaya, Bharuch	Vadodara
19	Ankleshwar	Bharuch, Gujarat	Nov. 21, 2011 11:00	10	Panchbati Rajput Chhatralaya, Bharuch	Vadodara
20	Karjan	Vadodara, Gujarat	Nov. 22, 2011 11:00	10	Khetivadi Utpann Bazar, Karjan	Vadodara
21	Valsad, Pardi	Valsad, Gujarat	Nov. 15, 2011 11:00	10	Industrial complex, Vapi	Surat
22	Valsad	Valsadi, Gujarat	Nov. 16, 2011 11:00	14	Shri Ganesh Hall, Mehtavad, Valsad	Surat
23	Gandevi	Navsari, Gujarat	Nov. 17, 2011 11:00	10	Sardar Smark Bhavan Hall, Gandevi	Surat
24	Jalalpore	Navsari, Gujarat	Nov. 18, 2011 11:00	4	Jalalpor Library Hall	Surat
25	Jalalpore, Navsari (Rural),	Navsari, Gujarat	Nov. 21, 2011 11:00	8	Jalalpor Library Hall	Surat

	Taluk / Tahsil	District/ State	Date/ Starting Time	No. of Invited Villages	Venue	CPM
26	Choryasi, Surat City, Palsana	Surat, Gujarat	Nov. 22, 2011 11:00	14	Sri Mahyavansi Bhawan, Palsana Samaj	Surat
27	Kamrej	Surat, Gujarat	Nov. 23, 2011 11:00	11	Sri Mahyavansi Thakor Samaj Hall, Kamrej,	Vadodara
28	Uran	Raigad, Maharashtra	Nov. 26, 2011 11:30	11	Vyayamshala, Uran	Mumbai
29	Panvel 1	Raigad, Maharashtra	Nov. 15, 2011 11:00	21	Gokhale Sabhagruha, Old Panvel	Mumbai
30	Panvel 2	Raigad, Maharashtra	Nov. 16, 2011 11:00	9	Near Grampanchayat Office, Usroli, Panvel	Mumbai
31	Kalyan, Bhiwandi	Thane, Maharashtra	Nov. 20, 2011 11:00	26	Greeta Hall, Shivaji Chowk, Kalyan (West)	Mumbai
32	Bhiwandi, Vasai	Thane, Maharashtra	Nov. 24, 2011 11:00	19	Vishwakarma Hall, Vasai	Mumbai
33	Palghar	Thane, Maharashtra	Nov. 21, 2011 11:00	27	Lion's Club Community Hall, Palghar	Mumbai
34	Dahanu, Talasari	Thane, Maharashtra	Nov. 23, 2011 11:00	22	Dahanu Rotary Trust, Dahanu Road	Mumbai
35	Thane	Thane, Maharashtra	Nov. 25, 2011 11:30	2	Wanmali Hall, Naupada, Thane	Mumbai
36	Umerngaon	Valsad, Maharashtra	Nov. 18, 2011 Noon	13	UIA Community Hall, Umerngaon	Mumbai

Source: JICA Survey Team

Agenda

- 1) Registration of the participants
- 2) Distribution of a handout, feedback form, writing pad and pen to the participants
- 3) Welcome address to the participants by a representative of the CPM offices of DFCCIL
- 4) Introduction of the DFCCIL and Railway officials present in the PCM to the participants
- 5) Introduction of Competent Authority, wherever present, to the participants
- 6) PowerPoint presentation on Draft RRP using laptop and projector on the project brief, relevant legislation, land acquisition process, compensation package, and grievance redress system, further information and contact of relevant organisations.
- 7) Distribution of drinks and snacks
- 8) Question and Answer session in which the questions raised by the participants are answered directly by the DFCCIL officials and the Competent Authority
- 9) Assistance in filling up of the feedback forms upon request by the participants and collection of distributed feedback form.
- 10) Vote of Thanks

In the implementation stage, assistance for setting up the venue, registering the participants, preparing and distributing the hand-outs, stationery and refreshments, giving presentation as well as facilitating PCM were given by the JST¹. In addition, at the PCM, the JST Indian experts occasionally assisted CPM officers or CA officers by giving supplemental explanation and information to PAPs as well as by calming PAPs agitation, whenever necessary.

¹ The checklists were used in order not to leave out important elements in preparation process. (see Attachment III).

3.3.3 Record of the Meeting

(1) Record of Participants

Name, gender, occupation, village to which the participants belong and other appropriate features were recorded at the entrance of each PCM.

(2) Record of the Contents of Meeting

At every PCM, the JST assisted in taking notes in order to produce the minutes of the meetings. In addition, PCMs were recorded by video- and audio -devices as well as photography.

(3) Feedback Forms

Feedback forms were distributed to collect further comments and suggestions from participants. Female assistant(s) helped participants to fill out the form when assistance in writing was required.

3.4 RESULTS OF THE PCM

PCMs for fast track RRP were conducted as planned. The participation and discussions are summarized in the following section.

As for the PCMs on the full RRP, all planned 35 PCMs and one village meeting were held as scheduled; however, two PCMs in Surat jurisdiction (#21 and #24 in Table 3.2) experienced very low participation of PAPs. Therefore, for PCM #21, a supplemental PCM was organized, re-inviting PAPs who belong to targeted villages. As for PCM #24, PAPs supposed to attend the PCM were re-invited to PCM #25 which was held next day. The summary results of all PCMs for full RRP are attached in Attachment III.3.3.

3.4.1 Participation and Discussions of the Fast Track RRP PCMs

Table 3.3 below summarizes results of attendance in PCMs for the fast track RRP. Out of a total 29 invited villages, over 570 people participated. Although six PCMs were organised and attended by villagers, it was discussed and agreed amongst JICA, DFCCIL and the JST that the PCM in Billimora village was acceptable and the fast track RRP was prepared for Billimora so that the official land acquisition (i.e. 20F Notification issuance) could be proceed as requested by DFCCIL.

For the remaining villages, it was considered that PCMs were not able to provide the opportunities for villagers to have meaningful discussions with the project proponents and not successful enough to proceed for the RRP and 20F issuance due to the lack of DFCCIL's concrete answers to villagers' requests and questions, lack of the presentation provision and unexpected participation of illiterate participants.

Table 3.3 Summary Results of Attendances for Fast Track RRP PCM

Venue	No. of Invited Villages	No. of Participant (Women)	Discussions
Billimora (Navsari)	1	30 (10)	<ul style="list-style-type: none"> ✓ Compensation based on the 2011 circle rate, not 2008 circle rate was requested. ✓ Compensation at market rate was requested. ✓ Eligibility for the natural descendant was questioned. ✓ Compensation payment in case of co-share titleholder was asked.
Dahanu (Thane)	11	240-250 (40)	<ul style="list-style-type: none"> ✓ Explanation on alignment (why DFC is taking a detour going through the farmers land: chichoo farm) was requested. ✓ Compensation based on the 2011 circle rate, not 2008 circle rate was requested. ✓ Compensation at market rate was requested. ✓ Many participants express their concern because their names are not listed in the land record so that they will be not eligible for compensation.
Birwadi (Thane)	4	6-8 PAPs (1) with 7 villages including Birwadi village head	<ul style="list-style-type: none"> ✓ There was a delay of the arrival of officials from CPM office, and some of the villagers left the venue before the opening of meeting. Thus, the presentation was not made.
Dongripada (Thane)	4	20-30 (30-35)	<ul style="list-style-type: none"> ✓ Participants are Scheduled Tribe people and most of them are illiterate. Extra assistances or compensation were requested as they are tribal and most are poor and illiterate.
Kalwar (Thane)	6	80 (2)	<ul style="list-style-type: none"> ✓ Compensation based on the 2011 circle rate, not 2008 circle rate was requested. ✓ Compensation at market rate was requested. ✓ Request for land-for-land compensation, as well as employment (one member of the affected family should get a job) were made.
Gaodevi (Thane)	3	200-250 (30-40)	<ul style="list-style-type: none"> ✓ Compensation based on the 2011 circle rate, not 2008 circle rate was requested. ✓ Compensation at market rate was requested. ✓ Building-for-building compensation was requested. ✓ Taking off the miss-erected pillars of land acquisition in PAPs plots was requested. ✓ Correction or/and update in land record (7/12 forms) was requested.

Source: JICA Survey Team

3.4.2 Participation and Organization of the Full RRP PCMs

(1) Participation at the Full RRP PCMs

Table 3.4 below summarizes the results of attendance in PCMs for full RRP. Out of a total 374 invited villages, 207 villages (55.3%) attended the PCMs in total. A total of 1,929 representatives from affected households, including both titleholders and non-titleholders that had been identified in the field by the Baseline Survey and Census, participated in the PCMs. Participation rates in respective CPM jurisdictions are summarized in the following tables. In case of CPM Mumbai jurisdiction, the total number of affected household is not clear as the Baseline Survey and Census has not been completed in some villages.

Table 3.4 Summary Results of Attendances for PCMs for Full RRP

CPM	(A)	(B)	(C)	(D)	(E)	(F)	(G)
	Total PCMs	No. of invited affected villages	No. of participating villages	Village participation rate (%)	No. of affected households	No. of participants	Household participation rate (%)
CPM Noida	12	105	58	55.2%	1379	478	34.7%
CPM Vadodara	7	49	30	61.2%	817	204	25.0%
CPM Surat	8	70	39	55.7 %	1077	408	37.9%
CPM Mumbai	9	150	80	53.3 %	N/A	839	N/A

Note: 1) No. of affected households in (F) are households identified so during the Baseline Survey and Census.

2) A representative of each affected household was invited to each PCM, and that is the basis of calculation of ratio (H).

3) No. of affected villages in (B) includes the villages where only government land is acquired. In case of CPM Mumbai, this number is 43.

Source: JICA Survey Team

CPM Noida Jurisdiction

Table 3.5 Results of the Full RRP-PCM in CPM Noida Jurisdiction

	Taluk / Tahsil	District / State	Date/Time	Time	No. of participating villages*	No. of participants
1	Rewari 1	Rewari, Haryana	Nov. 14, 2011	11:15-13:15	7	46
2	Rewari 2	Rewari, Haryana	Nov. 15, 2011	11:15-13:00	6	48
3	Tijara	Alwar, Rajasthan	Nov. 15, 2011	15:30-17:00	5	48
4	Taoru 1	Mewat, Haryana	Nov. 17, 2011	11:15-13:30	10	43
5	Taoru 2	Mewat, Haryana	Nov. 18, 2011	11:15-13:15	9	48
6	Nuh	Mewat, Haryana	Nov. 16, 2011	11:30-13:30	7	32
7	Sohna	Gurgaon, Haryana	Nov. 16, 2011	15:45-16:30	4	24
8	Palwal 1	Palwal, Haryana	Nov. 23, 2011	12:00-13:30	3	15
9	Palwal 2	Palwal, Haryana	Nov. 24, 2011	11:30-14:15	6	79
10	Ballabgarh	Faridabad, Haryana	Nov. 23, 2011	15:45-16:45	5	24
11	Faridabad	Faridabad, Haryana	Nov. 25, 2011	11:30-13:45	12	42
12	Sadar	G.B. Nagar, Uttar Pradesh	Nov. 21, 2011	11:30-12:30	2	29
13	4 villages	Faridabad, Haryana	Nov. 25, 2011	15:25-16:40	4	31

* This number is "villages-PCMs"; and therefore, the total number of this column does not correspond to the number described in (B) in Table 3.4.

Source: JICA Survey Team

CPM Vadodara Jurisdiction

Table 3.6 Results of the Full RRP-PCM in CPM Vadodara Jurisdiction

	Taluk / Tahsil	District / State	Date/Time	Time	No. of participating villages*	No. of participants
1	Olpad	Surat, Gujarat	Nov. 14, 2011	11:55-13:15	2	24
2	Mangrol	Surat, Gujarat	Nov. 15, 2011	11:15-12:35	3	40
3	Amod	Bharuch, Gujarat	Nov. 16, 2011	11:35-13:05	8	27
4	Bharuch 1	Bharuch, Gujarat	Nov. 17, 2011	11:45-13:15	3	16
5	Bharuch 2	Bharuch, Gujarat	Nov. 18, 2011	11:25-12:35	5	17
6	Ankleshwar	Bharuch, Gujarat	Nov. 21, 2011	11:35-13:25	13	35
7	Karjan, Vadodara	Vadodara, Gujarat	Nov. 22, 2011	11:30-13:15	9	45

* This number is "villages-PCMs"; and therefore, the total number of this column does not correspond to the number described in (B) in Table 3.4.

Source: JICA Survey Team

CPM Surat Jurisdiction

Table 3.7 Results of the Full RRP-PCM in CPM Surat Jurisdiction

	Taluk / Tahsil	District / State	Date/Time	Time	No. of participating villages*	No. of participants
1	Pardi, Valsad 1	Valsad, Gujarat	Nov. 15, 2011	12:30-13:00	1	1
2	Valsad 2	Valsad, Gujarat	Nov. 16, 2011	11:30-13:30	11	85
3	Gandevi	Navsari, Gujarat	Nov. 17, 2011	11:45-13:30	6	74
4	Jalalpore	Navsari, Gujarat	Nov. 18, 2011	11:00	N/A	N/A
5	Jalalpore, Navsari (Rural)	Navsari, Gujarat	Nov. 21, 2011	11:30-14:30	8	142
6	Choryasi**, Surat City**, Palsana	Surat, Gujarat	Nov. 22, 2011	11:45-13:15	7	24
7	Kamrej**	Surat, Gujarat	Nov. 23, 2011	11:30-13:45	7	44
8	Valsad	Valsad, Gujarat	Nov. 26, 2011	11:45-13:00	4	38

* This number is “villages-PCMs”; and therefore, the total number of this column does not correspond to the number described in (B) in Table 3.4.

** Includes several villages of each Taluk which come under CPM Vadodara Jurisdiction.

Source: JICA Survey Team

CPM Mumbai Jurisdiction

Table 3.8 Results of the Full RRP-PCM in CPM Mumbai Jurisdiction

	Taluk / Tahsil	District / State	Date/Time	Time	No. of participating villages*	No. of participants
1	Uran	Raigad, Maharashtra	Nov. 26, 2011	11:30-	1	19
2	Panvel 1	Raigad, Maharashtra	Nov. 15, 2011	11:55-13:35	16	51
3	Panvel 2	Raigad, Maharashtra	Nov. 16, 2011	11:45-13:00	8	68
4	Kalyan, Bhiwandi	Thane, Maharashtra	Nov. 20, 2011	11:30-13:30	6	79
5	Vasai	Thane, Maharashtra	Nov. 24, 2011	11:15-13:18	22	147
6	Palghar	Thane, Maharashtra	Nov. 21, 2011	11:00-13:05	19	194
7	Dahanu, Talasari	Thane, Maharashtra	Nov. 23, 2011	11:30-12:30	26	103
8	Thane	Thane, Maharashtra	Nov. 25, 2011	11:30-13:17	5	20
9	Umergaon**	Valsad, Maharashtra	Nov. 18, 2011	12:10-14:30	18	158

* This number is “villages-PCMs”; and therefore, the total number of this column does not correspond to the number described in (B) in Table 3.4.

** Includes several villages of Umergaon Taluk which come under CPM Surat Jurisdiction.

Source: JICA Survey Team

3.4.3 Analysis of Participants of the Full RRP PCMs

The participants included not only title-holders but also non-titleholders, although an exact numbers of non-titleholders were not recorded. Those non-titleholders expressed their concerns and opinions during PCMs. The women’s participation was relatively good both

in Surat and Mumbai, recording 78 and 97 out of a total 408 and 839 participants respectively; on the other hand, it was relatively low in both Noida and Valsad, recording 2 and 19 for 478 and 204, respectively, for the entire PCMs. Women's were especially encouraged to raise their concerns during the PCMs.

3.4.4 Key Issues Discussed in the PCMs of the Full RRP PCMs

At a series of PCM for draft RRP, participants raised many comments and questions regarding the project, alignments, impacts, compensations, resettlement assistance, employment, etc. Many of them were related to compensations, assistance and employment provisions. These issues were discussed and responded to by the CPM officers, Competent Authorities and experts at the PCMs. Among them, main comments and questions are described below. Major comments, questions and responses raised in the PCMs are also summarized in Attachment III.3.2.2.

a. General

- Participants wanted to know the concrete compensation rates at the PCMs. Some of PAPs showed disappointment with the content of the presentation and responses by the officers as they had expected to learn the exact amount they would receive, especially for their land.

b. Land Rate

- At almost all PCMs, the participants raised the issue of land rate. They said that there is a wide gap between true market rate and circle rate; and therefore, compensation rate should be based on the true market value.
- Reflecting the constant increase of land rate in recent years, some participants showed dissatisfaction with the rate being determined based on the cut-off date, and others, in Gujarat State particularly, demanded to apply the new circle rate, which had been adopted on April 1, 2011.
- Participants demanded that the market survey should be conducted by DFCCIL and the result should be shared with PAPs. In Maharashtra State, participants asked the progress of the activities conducted by the committee appointed by the state government for deciding the rate of compensation for land.
- In Gujarat and Uttar Pradesh states, previous examples of land acquisition by the State Government, including by Greater Noida Industrial Development Authority (GNIDA) and Gujarat Industrial Development Corporation (GIDC), were referred to by some of the participants. They said that similar rate for land should be applied to nearby land.

c. Compensation for Shifting Facilities

- Participants inquired whether the extra expenses that would be involved in shifting the facility, including building the electric poles, wires, etc., would be compensated by the DFCCIL.
- Participants asked what would happen if an irrigation channel is cut off by the alignment. In this case, the remaining land (larger portion) will be un-irrigated and become worthless. What will DFCCIL compensate for in such a case.

d. Relocation and Compensation for Non-title Holders

- Squatters raised their concerns, saying that a three months' notice is too short and insufficient to relocate themselves for they have no place to move to. (Desra Village, Navsari District)

- SC PAPs (encroachers) demanded to be provided some land to reconstruct their houses. Historically, the legal papers such as 7/12 land revenue record¹ had not been provided to the SC, who lived in the land for several decades. Their houses are shown on the village map issued by the District Revenue office, which means their claim was legal (Gothan village, Surat District).
- e. Compensation for the Wage Laborers**
 - Participants in Vadodara PCM jurisdiction mentioned that the (Joint Measurement) survey agency did not identify the number of agricultural laborers employed in the fields correctly and as a result, they were not able to receive compensation. *(It is suspected that some people are filing false claims, increasing the number of laborers after the compensation process was completed.)*
- f. Community Structures**
 - Some participants were worried whether their community properties would be affected: especially, whether the cremation grounds will be divided in two parts.
- g. Compensation for Outside ROW**
 - Participants pointed out that compensation should be paid for land within 30 meters of ROW since the Indian Railway does not allow developing structures in that area and PAPs cannot use these areas.
- h. Other Compensation-related Issues**
 - In some areas, the 20A Notification was canceled and reissued more than once. The people lost their source of income because they were not able to cultivate/utilize the land since the notification was published for the first time a few years back. Participants demanded that lost income should also be compensated.
 - Some demanded compensation for anticipated damage to crops, structures, and land caused by the activities during construction.
- i. Employment**
 - Development of the notice from the MOR, “one-job-per-affected family”, was one of the most serious concerns raised by the participants. At every PCM, participants requested officers to provide detailed information about the plan. PAP’s opinion for this matter included: permanent employment should be given to the PAPs; training costs should be also provided; a family, not a household, should get a job, as a household is often a conglomeration of several separate families, etc.
- j. PAP Should Receive Fair Share of the Project**
 - Some participants misunderstood that this project is a public-private partnership and the Indian Railways makes profit out of PAPs’ sacrifice. With this misperception, PAPs think that each PAP will be given partnership of the project, and a share of profit or pension should be provided. PAPs at several PCMs suggested that they should get some discount on fares for passenger trains.

¹ 7/12 extract is a document, which shows the names of the owners of the property. It contains details such as the Survey numbers, area, date from which the current owner's names were registered as owners. The 7/12 extract is issued by the Tehsildar or the concerned land authorities.

k. Middlemen

- Several PAPs had been contacted by touts and/or middlemen who promised them better compensation. Participants demanded that authorities should stop these people who might take advantage of ignorant PAPs on their entitlement and rights.

l. Language of Compensation Document

- A lawyer who represents some of PAPs in Gujarat said the letters given by the Competent Authority to PAPs that explain award were written in English, which most of the PAPs did not understand properly. They should be delivered in vernacular language.

m. Farmers Cannot Get New Land for Agriculture

- It was pointed out that farmers who lose 100% of their land will lose their right to buy agricultural land if they are not able to do so within six months.

n. Negative Impact

- Participants expressed their concern about negative impacts that may be caused by the Project. Farmers were worried that the construction of high tracks may result in flooding of their agricultural fields. PAPs who own structures were afraid that the freight trains may cause impact to old structures due to vibrations.

o. Demand for Changing Plans

- Some participants insisted that options for changing alignment and the width of ROW should be considered further by DFCCIL. Others insisted that existing roads and passages to farm lands should not be affected by the Project, and more ROBs or RUBs should be added.

p. Clarification of the Definition

- The definition of the marginal framers given in the Entitlement Matrix was challenged by a participant. He insists that it is not correct in the Gujarat context. The context defines marginal farmers as those who have less than 1.5 ha of farm land.

q. Vadodara

- PAPs in Vadodara who have already been paid did not know about some of the benefits, such as additional benefits to vulnerable persons, and therefore they were worried whether they received proper compensation. In addition, most of the PAPs were not aware of their entitlement regarding the payment of Rs. 15 per square meter for the land acquired over and above 1500 sq. m.

r. Incorrectness in 20A and Other Legal Documents

- There are many comments by PAPs in several PCMs indicating the incorrectness in the documents providing the foundation for compensation. These claims included discrepancies in 20A and mistakes in the 7/12 records, etc.

s. New Bill

- Many raised voices saying that land should be acquired only after the new land acquisition Bill, which has been submitted to the Parliament, is passed. They believe that they would miss some benefits that are mentioned on the new bill if the land is acquired before the bill is passed.

t. Frustration on Response from CPM Office/DFCCIL

- PAPs expressed their frustration saying that they had not received any response to the objections raised during one month notice after 20A Notification. They had submitted many applications to the CPM office but not a single reply had been received.
- PAPs mentioned that their concerns, suggestions, comments and demands raised at previous PCMs have not been taken by CPM office/DFCCIL, and no record of the meetings has been provided to PAPs despite written requests. They demanded to receive replies to their memorandum which was submitted at previous ESIA-PCM.
- PAPs requested that a copy of the final RRP Report having details on land compensation to each representative of PAP, as well as copies of NRRP 2007 and RAA 2008, should be provided to each village.
- Participants also demanded the presence of higher authorities, such as CA, at the PCMs.

u. Applicability of Tax on Compensation

- PAPs inquired whether each PAP would be subjected to 20% capital gain tax (income tax) on the compensation. If so, they insisted, this loss should be additionally compensated by the proponent. They demanded a clarification on this point.

v. De-Notification for Non-Acquired Land

- PAPs called for the de-notification of non-acquired land. When 20A notification was issued by DFCCIL, all activities in the entire area of a particular plot number were suspended. But now that the exact area to be acquired is identified, the remaining land should be de-notified so that PAPs can make use of this part of their land.

w. No Objection Certificate (NOC)

- PAPs demanded NOCs should be issued before acquisition starts. Once the land is acquired, they said, it would be very difficult to obtain NOC from the railway offices.

3.4.5 Key Issues from Feedback Form of the Full RRP PCMs

Through the filling out of feedback forms, the participants were requested to express concerns on the following three points: (i) on the provisions of Draft RRP presented in the meeting, (ii) on the land acquisition and compensation package and (iii) on any other issues. Most of the participants at the majority of the PCMs cooperated to fill out and submit the forms; however, frustrated PAPs in some venues rejected to submit forms. Some of the participants avoided submitting feedback form due to the following main reasons:

- Protest against the land acquisition
- Protest against the compensation policy

The collected feedback forms were analyzed and the outcome is summarized PCM-wise below.

1) CPM Noida Jurisdiction

In total, 361 feedback forms were filled out in 12 PCMs held in Noida jurisdiction. Among 596 opinions mentioned in these 361 feedback forms, 386 (64.8%) were about the compensation rate, requesting a better land rate. The demand for a job in the railway sector followed, being presented through 162 (27.2%) opinions. The remaining opinions included

various matters, i.e.: it is difficult to buy equally fertile land; the farm lands will be divided into two parts; the irrigation facilities should be compensated; etc.

2) CPM Vadodara Jurisdiction

In total, 137 feedback forms were filled out in all seven PCMs. Among 247 opinions from these 137 feedback forms, 108 (43.7%) were regarding compensation, despite the fact that most PAPs under the CPM Vadodara jurisdiction have already been paid compensation. They included the following: the overall compensation amount is insufficient; the compensation should be based on the true market value of land; etc. Demands for a job in the railway sector were presented through 47 (19.0%) opinions, ranked as their second concern. Certain numbers of opinions (34, 13.8%) still expressed their strong preference for “house for house/ land for land” compensation over cash compensation. In addition, a certain number of people (7, 2.8%) showed their dissatisfaction in the stage of the survey, which determined the compensation amount. The result of feedback from analysis in this jurisdiction reflected the reality that the dissatisfaction among certain PAPs lingers even after the payment of compensation.

3) CPM Surat Jurisdiction

In total, 205 feedback forms were filled out in five PCMs held in Surat jurisdiction. Among 498 opinions mentioned in these 205 feedback forms, 173 (34.7%) were about the compensation rate, requesting a land rate based on the actual market value. Preference for “house for house/ land for land” compensation over cash compensation was presented through 90 (18.1%) opinions, ranked as their second concern. The demand for a job in the railway sector followed, being presented through 43 (8.6%) opinions. The remaining opinions included various matters, i.e.: only waste lands should be acquired; the religious places should not be affected; etc.

4) CPM Mumbai Jurisdiction

A total of 321 feedback forms were filled out during the seven PCMs¹ and submitted at the end of each PCM. Among 589 comments extracted from these 321 feedback forms, 197 (33.4%) were regarding demands for a job in the railway sector, ranked as the biggest concern among the participants. Comments on land rate (145, 24.6%) and the request for “house for house/ land for land” compensation (132, 22.4%) followed. The compensation rate, which is believed by PAPs to be much lower than the real market value, might be the root cause for fundamental dissatisfactions among many PAPs. In addition, 59 (10.0%) raised concerns about errors in legal documents such as land records, reflecting the complexity of the land recording system in Maharashtra.

3.4.6 Lessons Learned from PCM (Procedural)

(1) Invitation Process

At almost all the PCMs, PAPs showed their dissatisfaction about the method of the invitation process, demanding that they receive a letter directly. This method might have been ideal; however, there is no complete record of names and addresses of all PAPs at the moment to pursue such an approach. Therefore, placing notices in several permanent locations in the village, including schools, dairy collection places, bus stands, public water places, etc., served as a good alternative to sending individual letters to PAPs after all. Another possible method could have been distributing pamphlets as well as keeping them

¹ These seven PCMs are held in Panvel (Rohinajan), Umergaon, Kalyan, Palghar, Dahanu, Vasai and Thane.

at commonly visited places within villages as another effective and economical alternative to spread the message among large sections of PAPs. On the other hand, the advertisement in the local newspapers, suggested by some of the PAPs, seemed to work for collecting a large number of participants, like PCMs in the CPM Mumbai Jurisdiction. However, it was not clear if all the participants could be actual PAPs/titleholders and non-titleholders affected by land acquisition and if it could still secure the opportunity for actual PAPs to speak out such sensitive compensation issues in front of the larger number of participants including non-PAPs.

(2) Participation of the Full RRP PCMs

The participation rate accounted between 20 - 30% of all households in Noida, Vadodara and Surat PCM jurisdictions. It was analyzed that the following facts contributed to this relative low participation rate:

- In villages in Vadodara and part of Surat jurisdictions, many of the PAPs have already been paid or awarded compensation (e.g., 185 out of 216 PAPs in a part of Bharuch District). Therefore, the majority of them might not have been interested in attending the meetings.
- PCMs took place during weekdays. Many PAPs did not want to lose their daily earnings or did not want to pay transportation fees by themselves for attending PCMs.
- Previously, two ESIA-related PCMs had been held in several months, targeting almost the same populations, which gave opportunities for PAPs to raise comments and concerns regarding not only environmental impacts but also resettlement and rehabilitation related issues.
- The low participation rate itself should not be of too much concern; rather, the reasons why many PAPs chose not to attend should be addressed by DFCCIL.

(3) Location of PCMs

At some PCMs, PAPs were not able to reach the venue because they could not find it. The venue of the PCMs should be very familiar for the participants. Also it should be close to the railway station or major bus stands for easy access as much as possible unless the affected villages are far away from the railway stations or major bus stands. Alternatively, common vehicles could have been provided to pick and drop PAPs from their respective villages if the number of affected village or participants are small enough.

(4) Presentation/Handouts

Contents of the presentation should have been localized, like including the state laws and policies, specific information including planned width of ROW, ROB and RUB, etc. In addition, some case examples¹ could have been included so that PAPs could relate themselves and understand their entitlement well.

(5) CPM Officers

The outcome of the PCMs often depended on the capacity and attitude of the attending CPM officers. The CPM officer showed his knowledge about entitlement, laws and regulations as well as situations in the field, PAPs were often satisfied with his

¹ Something like, "0.5 ha. of total 2 ha. land of Mr. A's in village B would be acquired. The acquired area has his house, 15 mango trees and a bore well, etc. What does he get for compensation?"

explanations, even though they do not agree with the contents. CPM officers should always carry related documents with them to answer the questions spontaneously raised by PAPs. Also, CPM offices should give more attention to the prepared materials, including contents of presentations and handouts, and make contributions to the contents at the preparatory stage of the PCMs.

(6) Attendance of CA

CA's presence is very important for the meaningful PCM as some of the critical questions can only be addressed by CA office, including land issues and compensation payments. Therefore, the CPM office should make efforts to secure the presence of CA officers.

(7) Special Attention to Women and SC/ST

Regional cultural contexts may have affected women's participation rates. It is said that women's participation in social activities are more accepted in Gujarat State than the Northern States, and actually there were higher participation rates in CPM Surat jurisdictions.

It was effective to collect diversified comments to let minority PAPs (non-titleholders, women, vulnerable groups, etc) who are sitting at the back to raise their concerns/queries, and not only allow people who are sitting in the front rows to voice their individual interests.

(8) Preparatory Workshop

Preparatory workshops, involving CPM officers, presenters, coordinators, and the JST contributed to the success of the PCM this time. They gave presenters and coordinators a clearer image of what they are required to do. They also brought more ownership, awareness and interest among CPM officers. In addition, the workshop contributed to build team spirit among related parties.

3.4.7 Recommendations for Further Actions

Some of the concerns and suggestions raised by the participants at the PCM for RRP are very important and require further attention by the CPM offices and DFCCIL for the smooth implementation of the land acquisition. In addition, further actions should be considered, including incorporating them into the Entitlement Matrix and/or reflecting them into relevant policies such as RAA 2008 or NRRP 2007, when relevant. Issues raised during the PCM include the following.

- a. The result of the market survey conducted by the CPM offices or the Committees appointed by state governments should be shared with PAPs, and if there is a large gap between the survey and circle rate, some adjustment should be considered.
- b. Land rates adopted by other land acquisition processes, especially the rate given in the State Government-led projects which happened recently in nearby areas, should be referred to by DFCCIL.
- c. The concrete detail regarding job provision for people affected by land acquisition for the railway projects should be clarified and communicated to the PAPs. This subject is one of the issues of greatest concern among the PAPs in all jurisdictions.
- d. Errors in the legal documents that become the foundation for the compensation and assistance, including land records and 20A notification, should be corrected and/or

updated. CPM offices and DFCCIL should give some direction and advice to PAPs regarding how to address this issue in order for them to receive appropriate compensation.

- e. The policy toward applicability of the new land acquisition Bill, which has been submitted to the Parliament, should be clearly defined and communicated to the PAPs.
- f. Copies of NRRP 2007 and RAA 2008 should be provided to the representatives of PAPs, most likely kept at the Panchayat offices for their access.
- g. The issue of taxation on the compensation should be clarified and information should be conveyed to PAPs.
- h. The de-notification of non-acquired remaining land should be done as soon as possible so that they can make use of this part of their land.
- i. MOR's "non-structure-is-allowed-in-thirty-meters-from-ROW" policy should be scrutinized and the mechanism to issue the NOCs should be considered and established in the near future.
- j. In Vadodara and Surat CPM Jurisdictions, land acquisition process has already started. Although PAPs are allowed to salvage trees after their land is cleared, it is not happening because CPM offices have not gotten permissions from the Forest Department to cut trees according to PAPs. This process need to be clarified and expedited.

CHAPTER 4 ASSISTANCE FOR INFORMATION DISSEMINATION REGARDING RRP

4.1 INTRODUCTION

The draft RRP report was disseminated to the PAFs, stakeholders and the implementation authorities for inviting comments and opinions before finalizing it. The draft RRP report was disclosed at DFCCIL Head office, CPM offices, District Collector offices, Major Stations, and Competent Authority offices. The objectives of information dissemination are as follows:

- 1) Disseminate information on the draft RRP including Entitlement Matrix to PAFs.
- 2) Collection of comments and opinions from PAFs on the draft RRP, which are reflected in the final RRP report.

In order to meet the requirements as well as to achieve the aforesaid objectives, the first stage, information dissemination was conducted when the draft RRP was prepared. The full draft RRP report (main report and appendices) in English is delivered and placed at DFCCIL head office, respective CPM offices, major existing railway stations, District Collector offices, and Competent Authority offices in all 14 districts along the proposed DFC alignment. Additionally, the summary of the draft RRP was prepared in local languages, namely Hindi, Gujarati and Marathi and was delivered to the Sarpanches (village head) of all the project affected villages along the proposed DFC alignment.

The JST has supported to arrange the process of information dissemination in a systematic, time bound and transparent manner through the local consultant in all project affected areas except in the State of Maharashtra to ensure widest possible public participation of the Project. DFCCIL has also directly contacted other organization, CRADLE, for two districts in the State of Maharashtra.

4.2 INFORMATION DISSEMINATION OF DRAFT RRP REPORT

The draft RRP main report and summary were distributed from November to December 2011. The approach and methodology followed for the process in draft RRP report stage are as follows:

- The summary of the draft RRP report in English and local languages was prepared by the JST and forwarded to DFCCIL head office as well as to respective CPM offices for review and approval. Upon approval, required number of copies was printed (see Attachment III.4.1).
- The draft RRP reports including summary in English and vernacular languages (Hindi, Gujarati and Marathi) were distributed as shown in Table 4.1.
- The draft RRP report was distributed to DFCCIL Head office, 4 CPM offices, 14 District Collector (DC) offices, 17 Major Stations including Junction Stations, and Competent Authority offices of 14 districts along the proposed DFC alignment. Full reports (Main and Appendices) were available there for public reviewing.
- Summary of the draft RRP report including Entitlement Matrix was distributed to Sarpanches of 374 project affected villages, 4 CPM offices, 14 DC offices, 17 Major Stations including Junction Stations, and Competent Authority offices of 14 districts along the proposed DFC alignment.

- In order to facilitate proper information dissemination of availability of draft RRP, report the public notice in vernacular languages, either Marathi, Gujarati or Hindi, were put up on the notice board of Gram Panchayat offices, DC offices, Competent Authority offices, all major railway stations, CPMs offices, and head office of DFCCIL (see Attachment III.4.2).
- Five villages under CPM Surat and two villages under CPM Vadodara initially refused accepting the summary of draft RRP report. However, with the persuasion of CPM officials, copies of summary were successfully redelivered to these villages. The draft RRP main report and summary were sent by post to the Competent Authority of Bharuch District.
- The information disclosure period was initially planned between 7 and 19 December, 2011, but later extended until 2 January, 2012 since redistribution in seven villages was completed on 22 December, 2011, considering ten days for review by the public.
- Comments and opinions on draft RRP report were received in writing through direct delivery, fax, or posted either directly to DFCCIL Head office, respective CPM offices or to the JST. A dedicated email (dfc.phase2@gmail.com) was also provided which was periodically monitored by the JST during disclosure period.
- At DFCCIL Head office, the draft RRP was also put up on the website of DFCCIL for public viewing.
- On termination of disclosure period, the JST requested DFCCIL Head office to ask all respective CPM offices to forward all comments, if any, received from PAPs or any other stakeholder.

Table 4.1 Distribution List of Draft RRP Report

Distribution Place			(A) Main report	(B) Summary				
				Total	English	Marathi	Gujarati	Hindi
DFCCIL Corporate office & 4 CPM/AGM offices	1	Corporate Office	3	20	5	5	5	5
	2	CPM-Mumbai	3	20	5	15		
	3	CPM-Surat	3	20	5		15	
	4	CPM-Vadodara	3	20	5		15	
	5	AGM-Rewari-Dadri	3	20	5			15
	Sub Total			15	100	25	20	35
Main Station Total: 17 Main Stations	1	Panvel(Jn)	1	10	5	5		
	2	Kalyan(Jn)	1	10	5	5		
	3	Vaitrna	1	10	5	5		
	4	Kelve Road	1	10	5	5		
	5	Palghar	1	10	5	5		
	6	Dahanu Road	1	10	5	5		
	7	Sanjan	1	10	5		5	
	8	Vapi	1	10	5		5	
	9	Valsad	1	10	5		5	
	10	Billmora(Jn)	1	10	5		5	
	11	Navsari	1	10	5		5	
	12	Sachin	1	10	5		5	
	13	Kosamba(Jn)	1	10	5		5	
	14	Saniali	1	10	5		5	
	15	Rewari(Jn)	1	10	5			5
	16	Faridabad	1	10	5			5
	17	Dadri	1	10	5			5
Sub Total			17	170	85	30	40	15

Distribution Place			(A) Main report	(B) Summary				
				Total	English	Marathi	Gujarati	Hindi
District <u>Total:</u> <u>14 districts</u>	1	Raigad	1	15	5	10		
	2	Thane	1	15	5	10		
	3	Valsad	1	15	5		10	
	4	Navasari	1	15	5		10	
	5	Surat	1	15	5		10	
	6	Bharuch	1	15	5		10	
	7	Vadodara	1	15	5		10	
	8	Rewari	1	15	5			10
	9	Alwar	1	15	5			10
	10	Mewat	1	15	5			10
	11	Gurgaon	1	15	5			10
	12	Palwal	1	15	5			10
	13	Faridabad	1	15	5			10
	14	Gautam Buddh Nagar	1	15	5			10
Sub Total			14	210	70	20	50	70
Competent Authorities <u>Total:</u> <u>14 districts</u>	1	Raigad	1	15	5	10		
	2	Thane	1	15	5	10		
	3	Valsad	1	15	5		10	
	4	Navasari	1	15	5		10	
	5	Surat	1	15	5		10	
	6	Bharuch	1	15	5		10	
	7	Vadodara	1	15	5		10	
	8	Rewari	1	15	5			10
	9	Alwar	1	15	5			10
	10	Mewat	1	15	5			10
	11	Gurgaon	1	15	5			10
	12	Palwal	1	15	5			10
	13	Faridabad	1	15	5			10
	14	Gautam Buddh Nagar	1	15	5			10
Sub Total			14	210	70	20	50	70
Affected Village* <u>Total:</u> <u>374 Villages</u>	136 villages in Maharashtra*		-	3,400	680	2,720		
	133 villages in Gujarat		-	3,325	665		2,660	
	105 villages in Haryana, Rajasthan, UP, Delhi		-	2,625	525			2,100
	Sub Total			-	9,350	1,870	2,720	2,660
Total			64	10,040	2,120	2,810	2,835	2,275

Note: 25 sets of the summary are distributed to each village : 5 in English and 20 in local languages

Source: JICA Survey Team

4.3 COLLECTED COMMENTS

Neither the JST nor DFCCIL Head office, CPM offices received any comment or opinion on the draft RRP report. However, many letters and emails came to CPM Surat and also directly to the JST in response to PCMs for draft RRP which were conducted in November 2011. These are not categorized as comments based on information dissemination of draft RRP report. However, original and scanned copies of all letters and emails were sent to DFCCIL Head office and respective CPM offices for necessary actions.

4.4 INFORMATION DISSEMINATION OF FINAL RRP REPORT

The information dissemination of final RRP Report will be conducted after completion of the Baseline Survey and Census and then finalization of the RRP report. Methodology for disclosure will be same as per disclosure of draft RRP report. The final RRP will be also disclosed on the website of DFCCIL for public viewing.

PART IV
REVIEW OF SITUATION OF LAND ACQUISITION, AND
RESETTLEMENT AND REHABILITATION OF PHASE 1
AND PHASE 2 SECTIONS

PART IV REVIEW OF SITUATION OF LAND ACQUISITION, AND RESETTLEMENT AND REHABILITATION OF PHASE 1 AND PHASE 2 SECTIONS

CHAPTER 1 REVIEW OF STATUS OF LAND ACQUISITION, AND RESETTLEMENT AND REHABILITATION

As per TOR of the JICA Survey, the JST reviewed (1) the monitoring results of land acquisition and Resettlement and Rehabilitation for Phase 1 section and (2) the current status of land acquisition and R&R of Phase 2 section, and reviewed the DFCCIL's current practice of land compensation provision at replacement cost and livelihood assistance provision. The major findings will be discussed in the following sections respectively.

1.1 REVIEW OF MONITORING RESULTS OF LAND ACQUISITION, AND RESETTLEMENT AND REHABILITATION OF PHASE 1 SECTION

1.1.1 Internal Monitoring by CPMs/SEMU

For Phase 1 and Phase 2, the land acquisition progress report was prepared and sent to SEMU/DFCCIL Corporate Office by CPM Offices every month, and the summary report is prepared by SEMU based on the CPMs' reports for MOR/Prime Minister's Office (PMO) every month. The same summary is uploaded on DFCCIL's website¹.

One of the major review results would be the lack of detailed data. Although it was agreed with the JICA Mission in the past, the detailed land acquisition monitoring forms were not submitted by CPM Offices to SEMU, Corporate Office. Thus, it is difficult to monitor the details at Corporate Office.

1.1.2 Internal Monitoring by Consultant for Phase 1 Engineering Service

The monitoring work by the Engineering Service started in July 2010. So far, four monitoring reports were submitted to DFCCIL, namely; October 2010, February 2011, July 2011, October 2011 and February 2012. Most of the monitoring reports were prepared based on the district-wise land acquisition progress data.

Overall, it was identified that the major recommendations based on the previous monitoring results are as follows:

- ✓ To update Chapters 2 and 4 for Baseline Survey and Census and Chapter 13 for Cost Estimate of the RRP report Chapter 13 will incorporate the results of the Baseline Survey and Census after the entire survey for Phase 1 is completed;
- ✓ To review whether additional compensation needs to be paid after the RRP finalization as agreed with JICA in the past;

¹ DFCCIL's monthly land acquisition progress is available at the following website:
http://dfccil.org/wps/portal/!ut/p/c1/04_SB8K8xLLM9MSSzPy8xBz9CP0os3iTOJAAQ09LYwMD3zBHA08Dp0A_MzdnYwtDi6B8pFm8gYWRr6-Psae7s4G7p6eXiamPoQEEENAdDrIPv36wPA7gaKDv55Gfm6ofqR9jItMeDwP9yJzU9MTkSv2C3AiDLJNQRQDc hdL8/dl2/d1/L0IJSklna2shL0ICakFBTXIBQkVVSQ0IBISEvWUZOQTFOSTUwLXchLzdfNFVUUUDFJOTMwME1WQTBjMEJRTjzGQzM4SDA!/?WCM_PORTLET=PC_7_4UTP1I9300MVA0I0BQN6FC38H0_WCM&WCM_GLOBAL_CONTEXT=/wps/wcm/connect/DFCCLibrary/dfccil/dfcc_project/western+corridor

- ✓ To request CPM Offices to fill out the detailed monitoring sheets on land acquisition and R&R progress;
- ✓ To appoint AGM/SEMUR which has been vacant for long time and to set up a SEMUR unit exclusively for the Western Corridor; and
- ✓ To monitor land transfer procedure of the government land in addition to the land acquisition procedure of the private land.

1.1.3 External Monitoring by an Independent Agency

Unfortunately, no external monitoring has been done for the Western Corridor although it was agreed that the bi-annual external monitoring in the past would be conducted. Monitoring for the Eastern Corridor is still in preparation.

1.2 CONFIRMATION OF CURRENT STATUS OF LAND ACQUISITION, AND RESETTLEMENT AND REHABILITATION OF PHASE 2 SECTION

1.2.1 Land Acquisition Status for Phase 2 Area

Overall, 100% of 20A has been issued for Phase 2 by October 2011 according to SEMUR's monthly progress report. As of January 2012, 20E was issued for 439 km out of 569 km (approx. 77% by length) and target completion of issuance is in June 2012, while 20F was issued for 142 km out of 569 km (approx. 25% by length). However, this consists of 20F issued at the early stage of the Preparatory Survey and the rest is for the government land transfer; therefore, no additional 20F was issued for the private land except Billimora Village (Navasari District) in July/August 2011 according to DFCCIL.

1.2.2 Land Rate as per State Legislation

As mentioned in Section 2.1.4, Chapter 2 of Part III, in Phase 2 area, there are two state legislations that need to be considered to calculate land compensation. As for the latter, the actual compensation rate will be decided by its committee, and there is no concrete rate established yet.

- Haryana Government Revenue and Disaster Management Department Notification (11 August 2011) - Haryana Government's Amendments in the Rehabilitation and Resettlement Policy 2010; and
- Ministry of Forest and Revenue Government Resolution (5 September 2011) - Appointment of Committee to decide the rate of compensation for land to be acquired by DFCCIL in the State of Maharashtra.

1.3 EVALUATION OF THE CURRENT PRACTICE OF LAND COMPENSATION AT REPLACEMENT VALUE AND LIVELIHOOD ASSISTANCE PROVISION

1.3.1 Land Compensation at Replacement Value

As for land compensation in Haryana State and Maharashtra State, DFCCIL's compensation rate for land (i.e. circle rate plus 60%) is mostly inadequate except for some specific districts where the circle rate is updated and high enough.

Besides Haryana state and Maharashtra State, it is generally still difficult to review whether the current DFCCIL's land compensation rate is equivalent to the market value or not due to the lack of data such as 20F issued for the Western Corridor and the market rates of land in the project area. However, from available information such as discussions in PCMs and discussions with CPM Offices or SEMU, it seems to be that DFCCIL's land compensation rate is acceptable in most areas in Rajasthan, but in Gujarat, it is not acceptable since the project area in Gujarat is either relatively developed area or rich farm land.

The land compensation rates need to be reviewed with more 20F data and possibly with the results of the market value survey which was commenced by DFCCIL from August 2011 onwards.

1.3.2 Livelihood Assistance

As described in the latest entitlement matrix dated January 18, 2011, most livelihood assistances provided by DFCCIL are monetary as follows:

- ✓ Rehabilitation assistance equivalent to 750 days of minimum agricultural wages for farmers who become landless or downgraded to a small or marginal farmer; or rehabilitation grant equivalent to 750 days of minimum agricultural wages to those families losing livelihood for titleholders, non-titleholders and share croppers, agricultural laborers and employees;
- ✓ Temporarily employment in the project construction with particular attention to Below Poverty Line (BPL) PAPs by the project contractor to the extent possible;
- ✓ Transitional allowance of Rs. 4,000/household;
- ✓ Training allowance of Rs. 4,000/household;
- ✓ Shifting allowance of Rs. 10,000/family;
- ✓ Rs. 25,000 for construction of working shed or shop for rural artisans, small traders, self employed person;
- ✓ Rs. 15,000 for the loss of cattle shed;
- ✓ House construction assistance and cost for the BPL; and
- ✓ Additional assistance equivalent to 300 days of minimum wages for ST.

Considering the extensive project area, it is not feasible to provide non-monetary livelihood assistance to various PAPs in the project area. For instance, as for the training allowance, it is quite difficult for DFCCIL to provide training programs which meet various demands of entitled PAPs since the project area varies from the rural area and the urban area and their occupations and education levels also differ. Therefore, it is reasonable to provide the monetary assistance for the livelihood assistance.

However, there are three potential concerns and recommendations regarding the livelihood assistance. Firstly, as MOR announced, it could be good to review whether a job provision to an affected PAP family can be added to the entitlement matrix since this is one of the most popular requests and this announcement is well known amongst PAPs according to the discussions of PCMs. Additionally, since it is announced officially by MOR, the same should be provided to the DFC Project in line with the MOR's railway project.

Secondly, since most compensation will be monetary only, it is important to make sure that the recipients will spend their compensation on livelihood assistance activities but not on irrelevant properties such as luxury goods and consumables so that they will not be worse off. To secure this, it is suggested to provide (1) certain educational workshops on how to plan their livelihood recovery and spend/save money and (2) actual assistance to

open a bank account or to deal with any administrative procedure with a help from a local but experienced NGO or self-help organization which specializes in R&R implementation and/or community development.

Thirdly, there was a discussion between JICA and DFCCIL for Phase 1 in the past regarding additional livelihood assistance for SC, and it was agreed that DFCCIL/MOR will provide additional assistance to SC PAPs if any SC PAPs are identified to fall into vulnerable group or BPL category. Since the entitlement matrix shall be the same for Phase 1 and Phase 2, it is suggested to review whether the additional assistance for SC needs to be added to the entitlement matrix.

CHAPTER 2 ASSISTANCE FOR LAND MARKET VALUE SURVEY

The land market value survey was conducted to be used for review of the discrepancies between DFCCIL's current land compensation rate (i.e. circle rate plus 60%) and the actual market value when reviewing the RRP for its project appraisal of JICA. Implementation of the survey was proposed by JICA in August 2010. As requested by JICA, DFCCIL agreed to conduct the survey in May 2011. Draft TOR was prepared by the JST and provided to DFCCIL via JICA in May 2011 (see Attachment IV.2.1). In August 2011, DFCCIL/CPM offices started procuring the consultant for the survey. The survey was completed, and the reports from each CPM office were submitted to JICA by February 2012.

Based on review of the survey reports by JICA survey team, major points to be supplemented for the survey are shown below;

1) General

The survey reports among the CPM offices are not uniformed in terms of report structure and quality. Especially, analysis and explanation on the gap between the compensation rate under the DFC Project and actual land market value are not mentioned as a conclusion of the survey in some reports. The survey report should be revised with common report structure among the CPM offices by referring the previous survey of the DFC Phase 1 Section. Also, supplemental information collection and/or field survey should be conducted, if necessary.

2) Coverage of the survey

Since the survey has not covered Raigad District, the survey should be conducted in Raigad District.

3) Explanation on gap between compensation rate under the DFC Project and actual land market value

Based on the survey result, large range of the gaps between the compensation rate under the DFC Project and actual land market value are shown between 9.7 times in Betwade Village and 1,230 times in Usarghar Village. Typo should be checked at first. Then, the reason of this gap should be explained; ex. The high value was answered by villagers intentionally. Also, low governmental rate should be explained; ex. Rs. 20/m² in Usarghar Village.

4) It is better to show the standard compensation rate, which was shown in the report of CPM Noida

In addition, relevant survey on land market value is being conducted under the CPM Mumbai office to be used for the new committee to decide the compensation rate for land to be acquired for the DFC Project, according to the CPM Mumbai office. It would be better to examine if the survey result can be utilized for the project appraisal and monitoring on the land compensation rate.

PART V

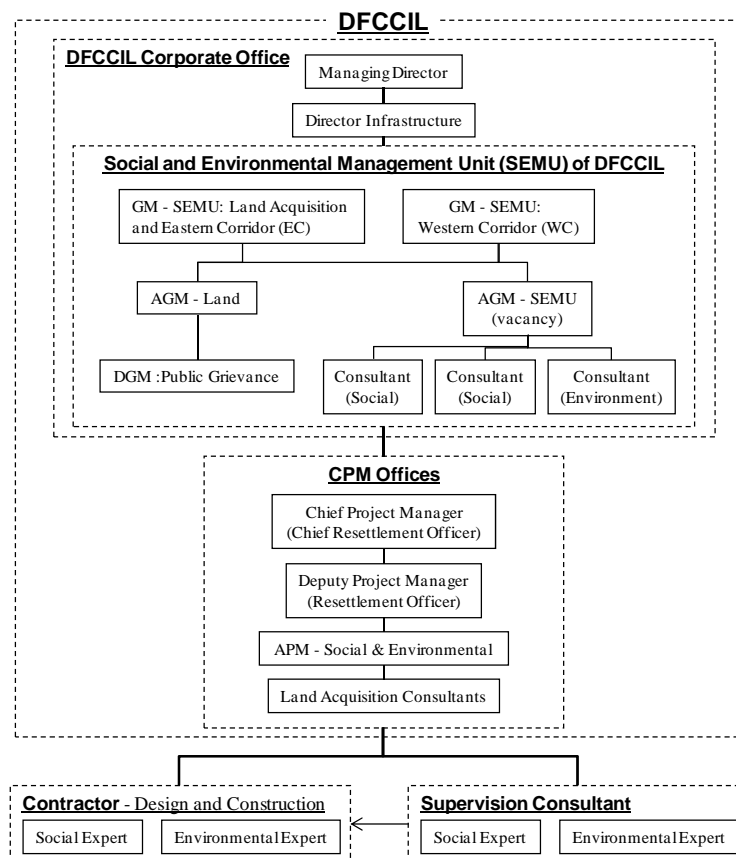
**PROPOSAL OF INSTITUTIONAL FRAMEWORK OF THE
PROJECT IMPLEMENTATION AGENCY FOR
ENVIRONMENTAL AND SOCIAL CONSIDERATIONS**

PART V PROPOSAL OF INSTITUTIONAL FRAMEWORK OF THE PROJECT IMPLEMENTATION AGENCY FOR ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

CHAPTER 1 PROPOSAL OF INSTITUTIONAL FRAMEWORK OF IMPLEMENTATION AGENCY FOR ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

1.1 CURRENT INSTITUTIONAL CAPACITIES FOR ENVIRONMENTAL AND SOCIAL CONSIDERATIONS OF THE PROJECT IMPLEMENTATION AGENCY

The current organizational structure for implementation of the environmental and social considerations under DFCCIL as project implementation agency for the DFC Phase 2 project such as EMP, EMoP, and RRP is shown in Figure 1.1. The responsibility for implementation and supervision of the environmental and social considerations for the DFC Project are vested with SEMU of DFCCIL and respective CPM offices.



Source: Modified from the Environmental and Social Management and Monitoring Plan (ESMMP) for Phase 1 Section of the Western Corridor, NK Consortium, April 2011.

Figure 1.1 Current Organizational Structure for Environmental and Social Considerations under DFCCIL

Key responsibilities for those parties are allocated as follows.

1) SEMU

SEMU is the section of DFCCIL that is responsible for managing environmental and social matters relating to the Project. It ensures the compliance with the environmental and social safeguard policies of the Government and lender(s), and relevant national laws. According to an Office Order issued by DFCCIL in January 2011, SEMU is responsible for the following tasks:

- All matters relating to environment, land acquisition, rehabilitation and resettlement with respect to the DFC Project;
- Internal DFCCIL policy and guidelines on environmental and social issues;
- Internal and external coordination on environmental and social matters (including coordination with zonal railways, the National Planning Commission, the Prime Minister's Office and other projects);
- Responding to Parliamentary questions, public representations, court cases and Right To Information queries on environmental and social issues; and
- Any other environmental and social matters or enquiries.

During project implementation, SEMU will be responsible for the following:

- (i) Procurement of the environmental permits/clearances that the project proponent is required to obtain;
- (ii) Ensuring necessary budgetary provision for implementing the EMP, EMoP and RRP;
- (iii) Coordinating and monitoring progress of CPM offices in implementing the EMP and EMoP, the land acquisition process, and the provisions of the RRP;
- (iv) Routinely reporting to the Director of Project Planning and the Director of Infrastructure on the above in relation to the Eastern and Western Corridors respectively;
- (v) Planning and commissioning training for project staff and others involved in managing environmental and social aspects of the project; and
- (vi) Providing guidance to field offices in matters related to environment, social issues and RRP implementation.

Under the required organizational structure as shown in Figure 1.1, there are currently two SEMU General Managers: one responsible for the Eastern Corridor and land acquisition along both corridors; and one responsible for the Western Corridor. They are supposed to be supported by one Additional General Manager (AGM Land) and one Deputy General Manager (DGM-Public Grievance). However, Assistant Project Manager (AGM) for SEMU Western Corridor is currently vacant. In addition, consultants for SEMU cover both Eastern and Western Corridors. Therefore, the consultants in charge of each corridor are required.

SEMU is responsible for the smooth implementation of RRP. During the course of the project implementation, SEMU will be responsible for the following related to the RRP implementation as per the RRP:

- Report to the Managing Director and the Director (Infrastructure) about the progress in land acquisition and Resettlement and Rehabilitation (R&R);
- Coordinate with the CPM offices, on the implementation of RRP;
- Prepare formats and agree on criteria for the verification of Project-Affected Families (PAFs);
- Review individual micro plan (including rehabilitation and resettlement entitlements)

- prepared by the CPM offices;
- Develop training modules for project staff and other functionaries on managing social aspects of the project;
- Guide CPM officers in matters related to resettlement and rehabilitation;
- Ensure budgetary provision for resettlement and rehabilitation of PAPs and relocation, rehabilitation and reconstruction of common property resources (CPRs);
- Ensure timely release of budget for implementation of RRP; and
- Any other work that may be assigned from time to time by the higher authority.

2) CPM Office

The CPM offices are responsible for dealing with the environmental and social issues of the project at the field level, and the main specific tasks in this regard are:

- Implementing the land acquisition and resettlement process and disbursing compensation to PAPs in conjunction with the Competent Authority as set out in the RRP;
- Managing local implementation of the EMP and EMoP for work conducted in the CPM area, including supervision of the Contractor to ensure mitigation is provided, and site observations of environmental practice and environmental and social impacts;
- Coordinating supervision and monitoring activity with the Engineer's Senior Environmental Officer/Manager and staff of construction Contractors to avoid duplication and ensure full EMP and EMoP implementation;
- Reporting on progress of the EMP and EMoP and Land Acquisition/RRP to SEMU and responding to queries, data requests, etc.; and
- Managing GRM and participating in site reviews and meetings to consider and resolve complaints.

Presently all CPMs and Deputies are in place, together with one or more Assistant Project Managers (APMs). Some APMs have been designated to deal with environmental and social aspects (mainly involving land acquisition at present).

The CPM offices are responsible for the implementation of RRP at field level. During the course of the project implementation, the CPM offices will be responsible for the following related to the RRP implementation as per the RRP:

- Co-ordinate with the District Administration, on Land Acquisition and rehabilitation and resettlement activities.
- To have a regular interaction with the Local Communities to develop good working relationship with one another.
- Disclosure of information in field offices.
- Supervise implementation of RRP. NGOs may be engaged, if required.
- Ensure the meetings on resettlement and rehabilitation policy and RRP and intensive information dissemination.
- Ensure inclusion of PAPs who could not be enumerated during census but have documentary evidence to be included in the list of PAPs.

- Develop and maintain a PAP level database including aspects related to losses, compensation, rehabilitation and resettlement entitlement, release of funds and utilization.
- Ensure that the rehabilitation and resettlement assistance is used for the purpose it is meant for.
- Ensure preparation of identity cards and distribution of the same to PAPs.
- Ensure disbursement of resettlement and rehabilitation assistance in a transparent manner.
- Participate in meetings related to resettlement and rehabilitation issues.
- Facilitate in opening of joint account of PAPs.
- Monitor physical and financial progress on Land Acquisition and rehabilitation and resettlement.
- Prepare monthly progress report related to physical and financial progress of implementation of RRP.
- Ensure the release of compensation and assistance before taking over the possession of land for start of construction work.
- Ensure relocation, rehabilitation and reconstruction of CPRs before dismantling through proper mechanism.
- Liaison with government and other agencies for inclusion of PAPs in employment and income generation program/scheme.
- Organize fortnightly meetings with the their staffs and Competent Authority to review the progress of rehabilitation and resettlement
- Send progress report of Land Acquisition and rehabilitation and resettlement to Head quarters.
- Attend meetings and participate in Grievance Redress Committee meetings for redress of grievances of PAPs.

3) Supervision Consultant

The Social and Environmental Experts of the Supervision Consultant are responsible for preparing ESMMP in the early stage of the Engineering Consultancy Service based on the EMP and EMoP in the ESIA Report. Then also carry out day-to-day monitoring on Contractor's compliance with the mitigation measures; and provide a quarterly monitoring report to DFCCIL in the construction supervision stage.

4) Contractor

The key responsibilities of the Contractor are based on the EMP and EMoP. It has to ensure the implementation of the environmental mitigation measures during the construction phase. Site-specific Environmental and Social Management Plan is to be prepared based on the EMP and is to be reviewed and approved by the Project Management Consultant. The contractor is responsible for obtaining the necessary permits from the statutory organizations such as for quarry site, burrow area, construction yard, and the labour camp.

1.2 INSTITUTIONAL CONSTRAINS FOR ENVIRONMENTAL AND SOCIAL CONSIDERATIONS IN THE PROJECT IMPLEMENTATION AGENCY

Capacity and capability of the environmental and social considerations for the Project are limited for the project implementation agency, namely SEMU and CPM offices, especially since there is no concrete mechanism to implement support for the resettlement as per the RRP. This situation would be a risk factor for the Project in the later stages.

1) SEMU

Under the SEMU, though there are currently two General Managers (GMs) in charge of the Eastern and Western Corridors, respectively, other staff are responsible for both corridors with few specialist. In addition, the position of the AGM-SEMU is currently vacant. The current organization structure of SEMU causes limited technical capacity of the unit as well as an increase in staff workload due to lack of staff number to implement necessary works on environmental and social considerations for such large-scale project. Under the situation, more number of specialist staff who are in charge of the Western Corridor covering the Phase 2 section is required with clear demarcation of their duties and responsibilities among the staff.

2) CPM Office

In the CPM offices, there is no position related to environmental and social considerations. The CPM and its staff, whose background are in different fields of engineering, are responsible for relevant work of the environmental and social considerations; mainly for land acquisition, while having other duties and responsibilities on engineering aspects simultaneously due to the limited number of CPM office staff. In general, the CPM office has limited technical capability on the environmental and social considerations and it is difficult for the CPM office to implement works requiring environmental and social expertise in a timely manner. In the further stage of the Project, it will be more difficult for the CPM office to handle the environmental and social considerations due to increase workload of the engineering aspects.

1.3 PROPOSED INSTITUTIONAL FRAMEWORK FOR THE PROJECT IMPLEMENTATION AGENCY FOR ENVIRONMENTAL AND SOCIAL CONSIDERATIONS AT PLANNING, CONSTRUCTION AND OPERATION STAGES

Considering the current constraints mentioned in the above section, the following institutional structures are proposed for SEMU and CPM office to implement environmental and social considerations in subsequent stages of the Project. Proposed institutional structure is shown in Figure 1.2.

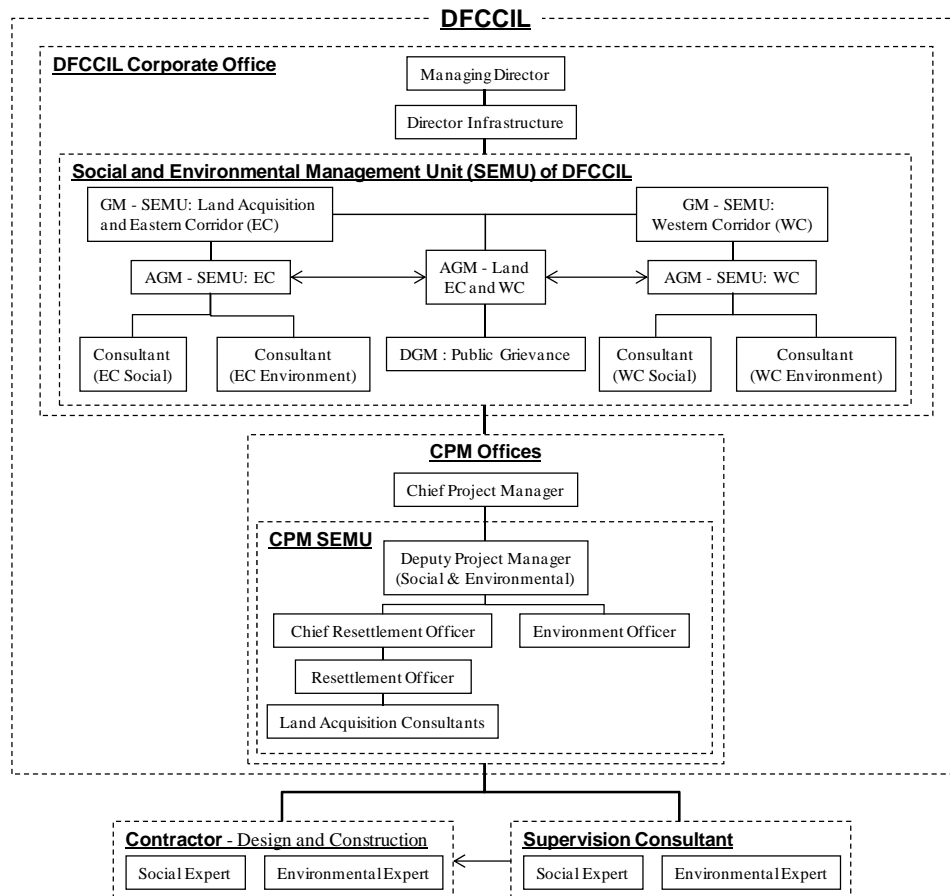
1) SEMU

Under the GMs for eastern and Western Corridors, AGM -SEMU and consultants for social and environmental aspects are to be allocated for both corridors separately. In addition, technical staff shall be allocated under the consultants.

2) CPM Office

A specialized unit for the environmental and social considerations shall be organised under each CPM office, headed by the Deputy Project Manager in charge of social and environmental aspects. Since the works on land acquisition, and resettlement and

rehabilitation would be more complex than those on environment for the CPM office, the chief resettlement office, resettlement officer, and land acquisition consultant are considered to be reassigned, respectively.



Source: Modified from the Environmental and Social Management and Monitoring Plan (ESMMP) for Phase 1 Section of the Western Corridor, NK Consortium, April 2011.

Figure 1.2 Proposed Organizational Structure for Environmental and Social Considerations under DFCCIL

1.4 PROPOSED CAPACITY DEVELOPMENT PROGRAM FOR THE PROJECT IMPLEMENTATION AGENCY

As mentioned in the ESMMP for Phase 1 Section of the Western Corridor, capacity development for the responsible organizations for environmental and social considerations under DFCCIL is required through the training program. There are four necessary training areas as follows:

- General awareness-raising for all levels within DFC regarding the importance of social and environmental issues in a local, national and global context, the potential impacts of railway development and the need for mitigation;
- Training on specific environmental/social management procedures or tools that will be encountered during DFC planning and implementation (e.g., ESIA, EMP, EMoP, etc.);
- Focused training on the rationale and approach to be followed in specific aspects of

the EMP and EMoP, given to managers and workers who will be responsible for direct implementation, including vegetation clearance, waste disposal, protection of air and water quality, interaction with the community, etc.; and

- Awareness-raising of the risks of HIV/AIDS and prevention methods, for those deemed most vulnerable, including workers housed at accommodation camps.

Training program should be conducted as suggested in the ESMMP for Phase 1 Section as follows.

Table 1.1 Outline of Training Program

	Target Group I	Target Group II	Target Group III
Participants	<u>Senior Managers:</u> DFCCIL MD, Directors, GMs, CPMs	<u>Middle-Managers, social & environmental specialists:</u> SEMUs: AGMs, DGM and Consultants; CPM Office: APMs (Environmental, Social) and Consultants (Land Acquisition, Environment); Contractors and Engineer: Environmental Managers	<u>Workers and Supervisors:</u> Contractors: Site Managers, workers and Supervisors
Programme	<u>Awareness-Raising:</u> Modules: 1, 2, 3 and 4 <u>Schedule:</u> 1 hr per month, 12-18 months	<u>Awareness-Raising:</u> Modules: 1, 2, 3, 4 and 5 <u>Schedule:</u> 1 hr per month, 12-18 months <u>Technical Development:</u> Modules 6, 7, 8, 9, 10, 11 and 12 <u>Schedule:</u> Two 1 hr sessions per month, 24 months	<u>Practical Environmental Protection:</u> Modules: 13, 14 and 15 <u>Schedule:</u> Three 1 hr sessions per week, 3 months; one 1 hr session per month, 9 months
Suggested Methods	Lectures Workshops Group Discussions Practical Exercises	Lectures Workshops Practical Exercises Visits to case study sites	Audio-visual presentations Informal talks Site demonstrations and hands-on practice

Note: Group I: Senior DFCCIL managers and decision-makers (head office and field units), comprising Managing Director, Directors, General Managers and Chief Project Managers.

Group II: Middle-managers and technical specialists in environmental and social sectors, comprising: SEMU AGMs, DGM and Consultants; CPM Office APMs (Social and Environmental) and Consultants (Land Acquisition and Environment); and Environmental Managers from Contractors and the Engineer.

Group III: Contractor's site managers, workers and supervisors.

Title of the training modules is shown in the following table. Components of the training modules are itemised in the ESMMP for Phase 1 Section

Source: Environmental and Social Management and Monitoring Plan (ESMMP) for Phase 1 Section of the Western Corridor, NK Consortium, April 2011.

Table 1.2 Training Modules in Environmental and Social Issues

A. Foundation Program
Module 1: Global and National Environmental and Social Issues
Module 2: Environmental and Social Issues in Railways - Introduction
Module 3: Key Environmental Issues in Railway Projects
Module 4: Key Social Issues in Railway Projects
Module 5: Environmental and Social Legislation: Content, Requirements and Application
B. Technical Development Program
Module 6: Environmental and Social Impact Assessment
Module 7: Rehabilitation and Resettlement
Module 8: Environmental Management Plans
Module 9: Rehabilitation and Resettlement Plans
Module 10: Environmentally Sound and Socially Acceptable Construction
Module 11: Planning for Environmentally Sustainable Operation
Module 12: Long-Term Environmental and Social Issues in Railway Management
C. HIV/AIDS
Module 13: HIV/AIDS Risks and Prevention
D. Practical Environmental Protection
Module 14: Practical Environmental Protection for the DFC Project - Introduction
Module 15: Key Techniques and Precautions – Approach to be Adopted

Source: Environmental and Social Management and Monitoring Plan (ESMMP) for Phase 1 Section of the Western Corridor, NK Consortium, April 2011.

CHAPTER 2 PROPOSAL OF TOR FOR SUPPORTING AGENCIES FOR ENVIRONMENTAL AND SOCIAL CONSIDERATIONS

2.1 IDENTIFIED PRESENT STRUCTURES OF SUPPORTING AGENCIES

(1) Consultant

Environmental and social consultants will be employed by DFCCIL during the engineering consultancy service and construction supervision stages to prepare detailed EMP/EMoP and implement the EMP/EMoP.

(2) External Monitoring Agency for RRP

It is common to conduct external monitoring for the environmental and social aspects, related to the rehabilitation and resettlement, for the donor-financed project. For the DFC Phase 2 section, implementation of the external monitoring is prescribed in the RRP. The external monitoring for RRP can be conducted by local consultants or NGOs, who are not in direct relationship with DFCCIL in implementation of the Project.

2.2 PROPOSED TOR FOR SUPPORTING AGENCIES

(1) Consultant

Main items of TOR for the consultant for the environmental and social considerations in the engineering consultancy service and construction supervision are proposed as follows:

1) Engineering consultancy service stage

In the DFCCIL's document for request for proposal for the DFC Phase 2 project on July 9, 2010, the TOR for consultant on environmental and social considerations is described as shown in Table 2.1.

Table 2.1 TOR for Consultant on Environmental and Social Considerations in Engineering Consultancy Service Stage

(f) Review and update of Environmental Management Plan (EMP) and Environmental Monitoring Plan (EMoP) in the EIA Report based on the results of review of Basic Design. Confirm inclusion of updated EMP and EMoP in the Bid Documents
(g) Preparation of Implementation Guidelines on Environmental Monitoring based on the updated EMoP for construction and operation stage
(h) Update of the Rehabilitation and Resettlement Plan (RRP) based on the results of review of Basic Design
(i) Preparation of Implementation Guidelines on Land Acquisition and Resettlement Progress and Post-resettlement Monitoring Plan
(j) Support and facilitate implementation of RRP both at the Headquarters and the CPMs
(k) Preparation of the Action Plan and formulation of the Implementation Framework for Labour Protection, including HIV/ AIDS Prevention Program, for construction workers

Source: Request for Proposal for Engineering Consultancy Services for Vadodara - JNPT & Rewari - Dadri Section, DFCCIL, July 9, 2010

In addition to the TOR, support for implementation of the Land Acquisition and Resettlement Progress and Post-resettlement Monitoring Plan will be required, considering the current progress of the land acquisition process and expected progress of the land acquisition and resettlement in the period of the engineering consultancy service stage.

2) Construction supervision stage

According to the proposed Contractor's Environmental and Social Management and Monitoring Plans, which are described in the ESMMP for Phase 1 section, the main tasks for the contractor on environmental and social considerations in the construction stage are described as shown in Table 2.2.

Table 2.2 Main Tasks for Contractor on Environmental and Social Considerations in Construction Stage

<p>2A: Contractor's Environmental and Social Management Plan</p> <p>1.1 The Contractor shall prepare an Environmental and Social Management Plan (ESMP) setting out in detail how he proposes to manage and minimise the environmental and social impacts of his activities throughout the construction period.</p> <p>1.2 The Contractor's ESMP shall be based on the Outline ESMP submitted with the Tender and shall have the content shown in Section 2 below.</p> <p>1.3 The Contractor shall submit his ESMP for review by the Engineer within 60 days after the Commencement Date of the Services, and shall amend the ESMP to address any comments made by the Engineer and submit a Final ESMP within 14 days of receipt of comments.</p> <p>1.4 The Final ESMP shall be binding on the Contractor for the duration of the Services</p> <p>2B: Contractor's Environmental and Social Monitoring Plan</p> <p>1.1 The Contractor shall prepare an Environmental and Social Monitoring Plan (ESMoP) setting out in detail the monitoring he proposes to conduct in order to:</p> <ul style="list-style-type: none">a. Ensure that each environmental mitigation measure that is his responsibility is provided as specified in Section 2.4 of his ESMP;b. Ensure that each environmental management measure is implemented as proposed in Section 2.5 of his ESMP;c. Ensure he complies with the requirements of all relevant national and state legislation and any consent conditions applied by government competent authorities;d. Determine whether each mitigation and management measure is protecting the environment as intended; ande. Detect any additional environmental impacts that may occur, for which additional mitigation may be needed. <p>1.2 The Contractor's ESMoP shall be based on the Outline ESMoP submitted with the Tender and shall have the content shown in Section 2 below.</p> <p>1.3 The Contractor shall submit his ESMoP for review by the Engineer within 60 days after the Commencement Date of the Services, and shall amend the ESMoP to address any comments made by the Engineer and submit a Final ESMoP within 14 days of receipt of comments.</p> <p>1.4 The Final ESMoP shall be binding on the Contractor for the duration of the Services</p>
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Source: Environmental and Social Management and Monitoring Plan (ESMMP) for Phase 1 Section of the Western Corridor, NK Consortium, April 2011

The same tasks will be applied for the the DFC Phase 2 section. Accordingly, the main tasks for the consultant in the construction supervision stage will be as follows:

- 1) Review of the ESMP, which will be prepared by the Contractor,
- 2) Supervise the Contractor in the implementation of the ESMP and provide technical advice, if necessary,
- 3) Review of the ESMoP, which will be prepared by the Contractor,
- 4) Supervise the Contractor in implementation of the ESMoP and provide technical advice, if necessary,
- 5) Support for implementation of the Post-resettlement Monitoring Plan based on the Implementation Guidelines on Land Acquisition and Resettlement Progress and Post-resettlement Monitoring Plan.

(2) External Monitoring Agency for RRP

Main items of TOR for the external monitoring agency for the RRP are proposed as follows as per the RRP for DFC Phase 2 section:

- 1) Key tasks for external monitoring
 - Review and verify the internal monitoring reports prepared by DFCCIL;
 - Review of socio-economic baseline census information of pre-displaced persons;
 - Identification and selection of impact indicators;
 - Impact assessment through formal and informal surveys with the affected persons;
 - Consultation with PAPs, officials, community leaders for preparing review report; and
 - Assess the resettlement efficiency, effectiveness, impact and sustainability, drawing lessons for future resettlement policy formulation and planning.
- 2) Indicators in monitoring and evaluation of the project
 - a) Socio-economic conditions of the PAPs in the post-resettlement period;
 - b) Communication and reactions from PAPs on entitlements, compensation, options, alternative developments and relocation timetables, etc.;
 - c) Changes in housing and income levels;
 - d) Rehabilitation of informal settlers;
 - e) Valuation of property;
 - f) Grievance procedures;
 - g) Disbursement of compensation; and
 - h) Level of satisfaction of PAPs in the post resettlement period.
- 3) Key issues to be monitored by project stage
 - a) Preparatory stage
 - Consultations;
 - Identification of PAPs and their numbers;
 - Identification of different categories of PAPs and their entitlements;
 - Collection of gender disaggregated data;
 - Inventory and losses survey;
 - Asset inventory;
 - Entitlements;
 - Valuation of different assets;
 - Budgeting;
 - Information dissemination;
 - Institutional arrangements; and
 - Implementation schedule review, budgets and line items expenditure.
 - b) Relocation and rehabilitation stage
 - Payment of compensation;
 - Livelihood restoration assistance and measures (monetary);
 - Relocation assistance;
 - Delivery of entitlement;
 - Grievance handling; and
 - Consultations.

4) Indicators for monitoring

The monitoring indicators can be divided in to four primary categories, which would provide insight to three types of benchmarks i.e.; process output and impact. The indicators are shown in Table 2.3.

Table 2.3 Monitoring Indicators

(1) Physical Indicators
1) Extent of land acquired
2) No. of structures demolished
3) Number of land owner's and users and private structure for which owner paid compensation
4) Number of families affected
5) Number of families approaching for purchase of agricultural land
6) Number of affected person's receiving assistance or compensation
7) Number of affected persons provided with transport facilities/shifting allowance/transition allowance.
(2) Social Indicators
1) Taking care of displacement of SC, ST, Women and Vulnerable people.
2) Number of appeals placed before DFCCIL and rehabilitation and resettlement/Grievance Committee
(3) Economic Indicators
1) Cash entitlement of PAP's
2) Overall livelihood
(4) Grievance
1) Cases of Land Acquisition referred to court which are pending and settled
2) Number of rehabilitation and resettlement/Grievance Committee meeting
3) Number of field visit of Rehabilitation Resettlement Officer (CPMs)
4) Number of cases disposed by rehabilitation and resettlement/Grievance Committee (CPM) and rehabilitation and resettlement/Grievance Committee (Headquarters) to the satisfaction of PAP's
5) Number of cases disposed by the Ombudsman
6) Number of cases disposed by the Arbitrator
(5) Financial Indicators
1) Amount of compensation paid for land/structure
2) Cash grant for shifting outsets
3) Cash grant for shifting cattle shed or work shed.
4) Amount paid for one time financial assistance
5) Amount paid for community structure development

Source: Rehabilitation and Resettlement Plan of the Dedicated Freight Corridor Project for JNPT-Vadodara & Rewari-Dadri, Draft Report, November 2011.

PART VI
DELIVERABLES OF THE SURVEY

PART VI DELIVERABLES OF THE SURVEY

CHAPTER 1 REPORTS

The following reports have been prepared and submitted to JICA and DFCCIL/MOR during the Survey as shown in Table 1.1.

Table 1.1 Reports under the Preparatory Survey

Reports	Date of Submission	Contents and Remarks
Inception Report (IC/R)	Aug. 2010	The IC/R discusses contents and methodologies, schedule, implementation organization of the survey. The content of the IC/R was agreed among JICA and C/P organizations (MOR and DFCCIL).
EIA Scoping and Framework	Sept. 2010	This report discusses the results of environmental scoping for the target sections of the Phase 2 of DFC Western Corridor and framework of environmental and social considerations study under the survey. The report mentioned the scoping matrix and checklist which show conceivable environmental and social impacts and their magnitude caused by the Project. The content of this report was discussed not only among JICA and C/P organizations (MOR and DFCCIL), but also at PCMs.
Draft ESIA Report	Sept. 2011	The Draft ESIA report was prepared to describe the results of survey, detailed analysis of the impacts caused by the Project and its mitigation measures, EMP and EMoP. The content of this report was discussed not only among JICA and C/P organizations (MOR and DFCCIL), but also at PCMs. The summaries of the Draft ESIA report in English, Hindi, Gujarati and Marathi were also prepared and distributed to all the project-affected villages to collect opinions and feedback from the public.
Final ESIA Report	Nov. 2011	The Draft ESIA report was finalized as Final ESIA report by reflecting comments and feedback from JICA, MOR/DFCCIL, and the public. The Final ESIA report has been approved by DFCCIL and has been disclosed at the JICA web-site. The summaries of the Final ESIA Report in English, Hindi, Gujarati and Marathi were also distributed to all the project-affected villages.
Draft Baseline Survey and Census Report	Oct. 2011	This draft report was prepared to discuss the tentative results of the Baseline Survey and Census as of mid October 2011. The approach and methodologies adapted to the survey were also explained. Since the Baseline Survey and Census has been continued, this draft report was updated and a soft copy of updated report is attached with the Final JICA Survey Report.
Draft RRP Report	Nov. 2011	The Draft RRP report was prepared based on the Draft Baseline Survey and Census Report to discuss the resettlement policy and entitlements, income restoration, institutional arrangement, monitoring and supervision, grievance redress mechanism, cost estimate, etc. The content of the report was discussed not only among JICA and C/P organizations (MOR and DFCCIL), but also at PCMs. The summaries of the Draft RRP Report in English, Hindi, Gujarati and Marathi were also prepared and distributed to all the project-affected villages to collect opinions and feedback from the public.
RRP Report (updated version)	Mar. 2012	The Draft RRP Report was updated by reflecting the updated results of the Baseline Survey and Census and comments and feedback from JICA, MOR/DFCCIL, and the public. A soft copy of the updated RRP report is attached with the Final JICA Survey Report.
Draft JICA Survey Report	Jan. 2012	The Draft JICA Survey Report contains background, approach and methodologies of the survey, all survey results, and further actions and recommendations.
Final JICA Survey Report	Mar. 2012	Final JICA Survey Report was prepared by reflecting the updated results of the Baseline Survey and Census and comments and feedback from JICA and MOR/DFCCIL on the Draft JICA Survey Report.

Source: JICA Survey Team

In addition to the above reports as official deliverables, a RRP report for Billimora village in Navasari District, namely Fast-track RRP report, was prepared and submitted to JICA and DFCCIL in July 2011.

Soft copies of EIA Scoping and Framework (Scoping report), Final ESIA report, Draft Baseline Survey and Census report (updated version), Fast-track RRP report, and RRP report (updated version) are enclosed in a CD which is attached on this report.

CHAPTER 2 OTHERS

In addition to the official deliverables, periodical reports to update DFCCIL and JICA such as the weekly report and biweekly report on the overall progress of the ESIA, the Baseline Survey and Census and RRP and the daily report on the progress of the Baseline Survey and Census were prepared and submitted to DFCCIL and JICA to share the progress so that all the parties can take actions to tackle the urgent issues.

2.1 WEEKLY AND BIWEEKLY REPORTS

2.1.1 Weekly Reports for JICA

The weekly report which was a brief e-mail report regarding the JST activities and survey plan was prepared and sent to JICA headquarters and JICA India office by the JST as per JICA's instruction from August 17, 2010 (Weekly Report No. 1) until May 17, 2011 (Weekly Report No. 39). As agreed with JICA, the weekly report was incorporated in the biweekly report which was initially sent to DFCCIL and copy to JICA as per DFCCIL's request.

2.1.2 Biweekly Progress Reports for DFCCIL and JICA

The biweekly progress report was prepared as per DFCCIL request and sent to SEMU, DFCCIL and other relevant DFCCIL staff and copied JICA headquarters and JICA India office from November 23, 2010 (Biweekly Report No. 1) until December 21, 2011 (Biweekly Report No. 25). The report includes (1) the overall schedule and progress of the ESIA, Baseline Survey and Census, and RRP studies, (2) district-wise or village-wise progress of the Baseline Survey and Census, (3) a detailed schedule or action plans of planned study components, such as PCM schedule or information disclosure schedule, (4) significant issues to be tackled by DFCCIL, JICA and JST, and (5) a list of pending issues/data for DFCCIL. The summary of the biweekly reports is shown in Table 2.1, while all biweekly report are enclosed in a CD which is also attached on this report.

Table 2.1 Summary of Biweekly Progress Reports

Report No.	Issue Date	Major Issues/Contents
1	23 Nov. 2011	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Missing data ✓ Schedule/progress of PCMs for ESIA (Scoping) ✓ Schedule/progress of the Baseline Survey and Census
2	10 Dec. 2011	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Missing data ✓ PCM outcomes for ESIA (Scoping) ✓ Progress of the Baseline Survey and Census ✓ Difficulty in the sensitive receptor and land use survey in detours under CPM Mumbai
3	27 Dec. 2010	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Missing data ✓ Re-holding PCMs (ESIA Scoping) in Thane and Raigad Districts ✓ Progress of the Baseline Survey and Census ✓ Difficulty in the sensitive receptor and land use survey in detours under CPM Mumbai
4	8 Jan. 2011	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Missing data ✓ Re-holding PCMs (ESIA Scoping) in Thane and Raigad Districts ✓ Progress of the Baseline Survey and Census

Report No.	Issue Date	Major Issues/Contents
5	23 Jan. 2011	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Missing data ✓ Schedule of re-holding PCMs (ESIA Scoping) in Thane and Raigad Districts ✓ Progress of the Baseline Survey and Census
6	4 Feb. 2011	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Missing data ✓ Schedule of re-holding PCMs (ESIA Scoping) in Thane and Raigad Districts ✓ Progress of the Baseline Survey and Census
7	21 Feb. 2011	<ul style="list-style-type: none"> ✓ Overall Survey progress ✓ Missing data ✓ Re-holding PCMs (ESIA Scoping) in Thane and Raigad Districts ✓ Delay in Baseline Survey and Census due to lack of data
8	07 Mar 2011	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Missing data ✓ Delay in Baseline Survey and Census due to lack of data
9	21 Mar. 2011	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Missing data
10	9 Apr. 2011	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Missing data
11	20 Apr. 2011	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Suspended Baseline Survey and Census in 106 villages of Faridabad, Vadodara, Bharuch, Surat, Navsari, Valsad and Thane Districts excluding the villages without the 20E/draft 20E. ✓ Missing data
12	10 May 2011	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Fast-track RRP schedule ✓ Missing data
13	29 Jun. 2011	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Remaining Baseline Survey and Census in GB Nagar, Palwal, Faridabad, Mewat, Bharuch, Surat, Valsad, Thane and Raigad Districts ✓ Missing data
14	ditto	✓ ditto
15	ditto	✓ ditto
16	5 Aug. 2011	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Remaining Baseline Survey and Census in Palwal, Faridabad, Mewat, Bharuch, Surat and Thane District ✓ CRADLE's mobilization for the Baseline Survey and Census in Raigad District ✓ Missing data
17	ditto	✓ ditto
18	30 Aug. 2011	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Remaining Baseline Survey and Census in 37 villages excluding 41 villages in Raigad District
19	18 Sep. 2011	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Remaining Baseline Survey and Census in 27 villages excluding 41 villages in Raigad District
20	4 Oct. 2011	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Remaining Baseline Survey and Census in Faridabad and Thane Districts ✓ New Baseline Survey and Census in GB Nagar
21	16 Oct. 2011	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Draft RRP PCM schedule ✓ Remaining Baseline Survey and Census in Faridabad and Thane Districts
22	2 Nov. 2011	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Draft RRP PCM schedule ✓ Remaining Baseline Survey and Census in Faridabad and Thane Districts
23	21 Nov. 2011	<ul style="list-style-type: none"> ✓ Overall survey progress ✓ Provisional outcomes of the PCMs for draft RRP in Nov. 2011 ✓ Remaining Baseline Survey and Census in Faridabad and Thane Districts

Report No.	Issue Date	Major Issues/Contents
24	13 Dec. 2011	✓ Overall survey progress ✓ Remaining Baseline Survey and Census in Faridabad and Thane Districts
25	21 Dec. 2011	✓ Overall survey progress ✓ Remaining Baseline Survey and Census in Faridabad and Thane Districts

Source: JICA Survey Team

2.2 DAILY REPORTS FOR BASELINE SURVEY AND CENSUS DURING FAST-TRACK RRP REPORT PREPARATION

The fast-track RRP preparation was requested by DFCCIL in early May 2011 in order to avoid repeating the time-consuming official land acquisition procedure (i.e. 20A and 20E issuance) as well as the delay in the project implementation because of 33 villages in Navsari and Thane Districts where 20E Notification lapsed in August 2011. Although it was very challenging, it was agreed to attempt the Baseline Survey and Census in these villages by May 27, 2011 so that the fast-track RRP can be prepared in early July 2011. Since the report needs to be prepared within a short time, it was decided to prepare and share the daily progress report of the Baseline Survey and Census so that all the parties, namely DFCCIL, JICA and the JST, could monitor the progress and take necessary actions immediately. Overall, the daily report was issued between May 8, 2011 and May 27, 2011 as shown in Table 2.2.

Table 2.2 Daily Reports for the Baseline Survey and Census for the Fast-Track RRP

Report No.	Issue Date	Contents/Issues
1	8 May 2011	Survey coverage upto 7 May 2011
2	9 May 2011	Survey coverage upto 8 May 2011
3	10 May 2011	Survey coverage upto 9 May 2011
4	11 May 2011	Survey coverage upto 10 May 2011
5	13 May 2011	Survey coverage upto 10 May 2011
6	17 May 2011	Survey coverage upto 15 May 2011
7	19 May 2011	Survey coverage upto 17 May 2011
8	21 May 2011	Survey coverage upto 19 May 2011
9	22 May 2011	Survey coverage upto 20 May 2011
10	24 May 2011	Survey coverage upto 20 May 2011
11	27 May 2011	Survey coverage upto 25 May 2011

Source: JICA Survey Team

2.3 COLLECTED INFORMATION AND DOCUMENTS

The collected information and documents during the survey are summarized in Attachment VI.1.1.

PART VII

FURTHER ACTIONS AND RECOMMENDATIONS

PART VII FURTHER ACTIONS AND RECOMMENDATIONS

CHAPTER 1 FURTHER ACTIONS

1.1 FURTHER ACTIONS BY DFCCIL

(1) ESIA

- 1) Further studies and planning as per the ESIA

In the subsequent stage of the Project, further studies and planning have to be done by DFCCIL or other organization under/with DFCCIL based on the ESIA as summarized in Table 1.1.

Table 1.1 Necessary Studies and Plans on ESIA in Further Project Stage

Necessary Study/Plan	Responsible Body	Timing
(1) Preparation of an action plan for tree felling	Contractor under CPM offices	Before land clearance work
(2) Detailed study of the SGNP	Experts / institutes under DFCCIL / CPM Mumbai office	Detailed engineering stage
(3) Detailed hydrological study and monitoring in Dahanu Taluka Eco-Sensitive Area	Experts / institutes under DFCCIL/CPM Noida office	Detailed engineering, pre-construction, construction, and post-construction stages
(4) Geotechnical and slope stability study in Aravalli Eco-sensitive area	Experts / institutes under DFCCIL/CPM Noida office	Detailed engineering stage
(5) Standard penetration test borings and detailed study for assessment of liquefaction potential in Aravalli Eco-sensitive area	Experts / institutes under DFCCIL/CPM Noida office	Pre-construction stage
(6) Hydro-geological investigation and permeability tests in Aravalli Eco-sensitive area	Experts / institutes under DFCCIL/CPM Noida office	Detailed engineering stage or pre-construction stage
(7) Study on safeguard of groundwater dependent ecosystems in Aravalli Eco-sensitive area	Experts / institutes under DFCCIL/CPM Noida office	Detailed engineering stage
(8) Detailed study for establishing geochemical profile of the groundwater	Experts / institutes under CPM offices	Detailed engineering stage or pre-construction stage
(9) Preparation of a comprehensive plan for rain water harvesting and artificial recharge to groundwater	Experts / institutes under CPM offices	Detailed engineering stage or pre-construction stage
(10) Detailed hydrological study	Experts / institutes under CPM offices	Detailed engineering stage or pre-construction stage
(11) Preparation of an integrated management plan for mangrove areas	Experts / institutes under CPM Mumbai office	Detailed engineering stage or pre-construction stage

Source: JICA Survey Team

- 2) Environmental clearances for protected area
 - a) Statutory clearance

The statutory clearances need to be obtained by CPM office/SEMU for the following;

- i) Sanjay Gandhi National Park
- ii) Dahanu Eco-Sensitive Zone

iii) Aravalli Range Eco-Sensitive Zone

b) Forest clearance

The forest clearances need to be obtained by CPM office/SEMUR for the following;

- i) 1 Recorded Forest in G. B. Nagar District (Gulistanpur Reserved Forest)
- ii) 19 Recorded Forests in Thane District¹ (listed on p. S-26 of ESIA Vol. 1 & details in Vol. 2)
- iii) 5 mangrove areas in Thane District² (listed on p. 3-19 of ESIA Vol. 1).

3) Completion of the Final ESIA Report Distribution

As of early March 2012, two villages³ in Faridabad District have been refused to receive the Final ESIA summary due to refusal of the land acquisition under the Project. As soon as the issue is solved, the Final ESIA summary should distribute those villages.

4) Implementation of the environmental management/mitigation measures in ESIA

In relation with the mitigation measures proposed in the ESIA report depending on the site condition and project features as well as impact evaluation at the time of ESIA study, it is recommended to have detailed examination in further stage of the Project in order to mitigate concerned environmental and social impacts for the following examples.

- Regarding the noise impact, location of sensitive receptors and houses which are located in the proximity of the DFC alignment should be confirmed in the field by using the latest information. In the case where such likely impact receptors are found, adequate mitigation measures should be examined if necessary as result of impact evaluation.
- In the meeting on the DFC alignment and proposed development plan in Faridabad District, which was held between Haryana State government and DFCCIL on 20 Dec. 2011, DFCCIL agreed on the following environmental and social considerations measures (see the meeting minutes for more details as shown in Attachment VII.1.1.);
 - to provide connectivity across the DFC at all major intersections of the sector dividing roads such as underpass; and
 - to acquire and develop, at their own cost, a green belt of 30-m width on both sides, in addition to the 60-m width of the Freight Corridor. DFCCIL also agreed to construct a 12-m wide service road within this 30-m wide green belt, for the entire length of the Freight Corridor passing through the Urbanized Area.

Based the agreement, the above measures should be examined in detail in the further stage of the Project. Especially, in the case where the green belt development requires additional land acquisition, existence of the PAP should be surveyed and the Baseline Survey and Census should be conducted as well as reflecting the survey results into the RRP, if any PAP.

In addition, detailed cost should be estimated in the preparation of the ESMMP during the Engineering Consultancy Service stage. There is a possibility that additional cost for

¹ (1) Ovali Reserved Forest; (2) Nagale Forest; (3) Sarjamori Forest; (4) Shilottar Forest; (5) Dhaniv Forest; (6) Bhatpada Forest; (7) Bilalpada Reserved Forest; (8) Kasarali Forest; (9) Kelve Road Forest; (10) Kasbe Mahim Forest; (11) Dandipada Forest; (12) Boisar Forest; (13) Rani Shirgaon Forest; (14) Kolavali Forest; (15) Vangaon Forest; (16) Pade Forest; (17) Ambevadi Forest; (18) Gholvad Forest; and (19) Bordee Forest.

² (1) Village Malodhi; (2) Village Kasarali; (3) Wadiv Saravali near Vaitarna Creek; (4) Village Sirgaon; and (5) Ulhas River

³ Fatehpur Billoch and Prahladpur Villages

mitigation measure, which has not been clarified at this stage with its necessity and specification, is needed such as plantations and noise barrier.

5) Implementation of the environmental monitoring in ESIA

Based on the EMoP proposed in the ESIA report, a detailed EMoP should be prepared in further stage of the Project, by examining the latest project information, to implement EMoP adequately in the construction and operation stages. For this purpose, institutional setting for implementing the EMoP should also be included in the detailed examination.

(2) RRP

In the subsequent stage of the Project, further actions and arrangements have to be done based on the RRP. The following main items are required for further activities and arrangements for the Phase 2 RRP are explained below.

1) Completion of the Baseline Survey and Census

The Baseline Survey and Census is still in progress in four villages in Faridabad⁴ as of end of February 2012 due to public unrest and other reasons. After the field work is completed, the survey data shall be incorporated into the RRP, and the RRP report shall be finalized accordingly. As for the remaining survey, if the project timeline allows, the field survey shall be conducted as much as possible to cover the maximum number of PAFs so that more accurate pictures of PAFs can be captured in order to avoid any confusion in the later implementation and monitoring stages such as when compensation is awarded and when the future monitoring is conducted.

2) Survey and Confirmation in the Area where the Notification 20A is re-issued

The cut-off date for the Project is the date of issuing the Notification 20A. In some area, the Notification 20A has been expired and has to be re-issued. In such area, in the case where the Baseline Survey and Census has been completed before re-issuing the Notification 20A, new non-titleholder(s), who move into the area during the period between expiration date of the Notification 20A and re-issuing date of the Notification 20A, will not be covered by the Baseline Survey and Census and may not be subject to the assistance under the RRP. Therefore, re-survey for the non-titleholder(s) is required in such area after re-issuing the Notification 20A.

In addition, it is suggested to confirm of the titleholders, after re-issuing the Notification 20A, if there is any difference during the period between before expiration of the Notification 20A and re-issuing the Notification 20A. In the case where ne titleholder is found, the Baseline Survey and Census should be conducted for the new titleholder(s).

3) Finalization of the RRP and its information disclosure

The RRP report need to be finalized as soon as the Baseline Survey and Census for the remaining 4 villages in Faridabad District. After finalizing the RRP report, information disclosure of the final RRP need to be conducted. The same methodology taken for the draft RRP should be taken for the information disclosure, though the comment collection process is not necessary. In addition, the final RRP should be disclosed in the Website of the DFCCIL as the ones in Phase 1 section and the Eastern Corridor.

⁴ Pahaladpur, Fatepur Biloch, Ladauli, and Bahbalpur Villages

4) Further public consultation

Further public consultation shall be organized continuously until land acquisition and R&R are completed. There seems to be some confusion on the compensation and assistance amongst PAPs, which is very common in other projects, since the compensation issue is very complicated. Therefore, continuous public consultation is required especially at the level of CPM office to clarify any issues raised by the PAPs and shall be recorded by the CPM offices and DFCCIL Head office until the land acquisition is completed. In fact, in some villages, CPM offices have been having a casual/informal consultation meeting on land acquisition and R&R issues, although they were not recorded. It is suggested that in the future, any meetings with PAPs shall be recorded since they are also part of public consultation and need to be monitored.

5) Review of activities and institutional arrangement proposed in the RRP for the implementation stage

- Although the internal monitoring has been done internally by CPM offices and SEMU, the internal monitoring needs to be done in accordance with the agreement between DFCCIL/MOR and JICA. Namely, the monitoring of land acquisition and resettlement and rehabilitation progress by village was requested by JICA in the past, and the relevant data including the copy of 20F needs to be available at Corporate Office as well.
- Complaints and official objections records shall be shared by relevant organisations, namely CA, CPMs and DFCCIL Corporate office. Although CA is fully responsible for complaints and official objections regarding land acquisition and compensation, DFCCIL (both Corporate Office and CPMs) need to track them as the project proponent and the data shall be available at DFCCIL since they are also subject to the internal and external monitoring required by JICA.
- Current institutional arrangement for SEMU's tasks needs to be reviewed. For instance, there is a vacancy for AGM/SEMU. The grievance redress was established at Corporate Office but not at the field level. Moreover, an ombudsman which was proposed in the RAP for the Eastern Corridor (March 2011) is not established yet.
- Institutional arrangement for SEMU's tasks at CPM offices needs to be improved, and an adequate number of staff needs to be secured especially for on-going land acquisition procedure. If necessary, an experienced local NGO specialised in resettlement and rehabilitation and/or community development could be hired to manage activities of land acquisition and R&R work and its record keeping at CPM offices.
- The external monitoring shall be done in accordance with the agreement with JICA by hiring the external agency.

6) Revision of the Land Market Value Survey reports

The land market value survey was conducted to be used for review of the discrepancies between DFCCIL's current land compensation rate (i.e. circle rate plus 60%) and the actual market value when reviewing the RRP for its project appraisal of JICA. Implementation of the survey was proposed by JICA in August 2010. As requested by JICA, DFCCIL agreed to conduct the survey in May 2011. Draft TOR was prepared by the JST and provided to DFCCIL via JICA in May 2011 (see Attachment IV.2.1). In August 2011, DFCCIL/CPM offices started procuring the consultant for the survey. The survey was completed, and the reports from each CPM office were submitted to JICA by February 2012.

Based on review of the survey reports by JICA survey team, major points to be supplemented for the survey are shown below;

1) General

The survey reports among the CPM offices are not uniformed in terms of report structure and quality. Especially, analysis and explanation on the gap between the compensation rate under the DFC Project and actual land market value are not mentioned as a conclusion of the survey in some reports. The survey report should be revised with common report structure among the CPM offices by referring the previous survey of the DFC Phase 1 Section. Also, supplemental information collection and/or field survey should be conducted, if necessary.

2) Coverage of the survey

Since the survey has not covered Raigad District, the survey should be conducted in Raigad District.

3) Explanation on gap between compensation rate under the DFC Project and actual land market value

Based on the survey result, large range of the gaps between the compensation rate under the DFC Project and actual land market value are shown between 9.7 times in Betwade Village and 1,230 times in Usarghar Village. Typo should be checked at first. Then, the reason of this gap should be explained; ex. The high value was answered by villagers intentionally. Also, low governmental rate should be explained; ex. Rs. 20/m² in Usarghar Village.

4) It is better to show the standard compensation rate, which was shown in the report of CPM Noida

In addition, relevant survey on land market value is being conducted under the CPM Mumbai office to be used for the new committee to decide the compensation rate for land to be acquired for the DFC Project, according to the CPM Mumbai office. It would be better to examine if the survey result can be utilized for the project appraisal and monitoring on the land compensation rate.

Table 1.2 Necessary Actions and Arrangements on RRP in Further Project Stage

Necessary Action/Arrangement	Responsible Body	Timing
(1) Baseline Survey and Census for 4 villages in Faridabad and finalization of the RRP	DFCCIL/CPM Noida office	Before the loan appraisal by JICA
(2) Survey and confirmation in the Area where the Notification 20A is re-issued	DFCCIL/CPM offices	Immediately after re-issuing the Notification 20A
(3) Information disclosure of the final RRP	DFCCIL/CPM offices	Immediately after finalization of the RRP
(4) Further public consultation	DFCCIL/CPM offices	Whenever necessary till completion of the land acquisition and R&R process
(5) Review of RRP	DFCCIL/CPM offices	Immediately after finalization of the RRP
(6) Revision of the Land Market Value Survey reports	DFCCIL/CPM offices	As soon as possible, before the loan appraisal by JICA

Source: JICA Survey Team

1.2 FURTHER ACTIONS BY JICA

(1) ESIA

As action to be taken by JICA in relation to the ESIA, confirmation should be made on the preparation of the detailed implementation plans of the EMP and EMoP, in the detailed design stage and their implementation in the construction and operation stages.

JICA would review and monitor the above activities regularly through the periodical progress report to be submitted by DFCCIL and monitoring mission in the field. In the case where inappropriate plan and/or implementation of the EMP and/or EMoP is found, JICA would advise DFCCIL regarding appropriate measures/actions to be taken.

(2) RRP

As actions to be taken by JICA in relation to the RRP, confirmation should be made on appropriate land acquisition and resettlement process, especially the compensation rate and provision of supports for livelihood recovery.

Since the local municipal government, who has not been involved in the preparation process of the RRP, is in charge of the land acquisition process, the land acquisition procedures may be proceeded only as per the RAA 2008, but not to comply with RRP, especially supports related to the relocation and livelihood recovery.

JICA would review and monitor the above activities regularly through the periodical progress report to be submitted by DFCCIL and monitoring mission in the field. In the case where inappropriate plan and/or implementation of the RRP is found, JICA would advise DFCCIL on appropriate measures/actions to be taken.

CHAPTER 2 RECOMMENDATIONS

2.1 RECOMMENDATIONS FOR ESIA

(1) Pollution Control

The ESIA study showed that air quality will not be disturbed along the corridor during operation of the DFC Phase 2 project as the freight train will be electrified. The air quality may be disturbed even though it is a temporary impact during the construction period due to the excavation and movement of dumpers. Implementation of regular monitoring efforts by the respective State Pollution Control Boards would help plug in the air pollutants to some extent which is caused by industrialization.

The water quality will not receive any adverse impacts due to the operation of the proposed project. In the construction phase, preventive actions are required to avoid short term impacts. The constructions on bridges have started at several locations in JNPT-Vadodara section and increase in the silt, oil and grease content in the river waters has been observed. The impacts are due to the cofferdams and bridge construction. It is suggested to implement suitable mitigation measures so that the impacts caused during the construction stage are short lived.

The water quality monitoring results showed that the river waters are already polluted due to the industrialization and disposal of sewage. Untreated wastewater and sewerage join the rivers which further pollute the river's water quality. Therefore, it is recommended that only treated wastewater should be disposed into the river.

Noise and vibration will be generated during construction and operation stages. Therefore, preventive measures should be taken so that impact can be reduced in residential areas, sensitive receptors, and eco-sensitive areas. Necessary engineering design should be worked out and implemented during the construction of the Project. The ESIA study revealed that some sensitive receptors and residential areas are falling near corridor and will have impact due to noise and vibration. Therefore, preventive measures should be taken in such areas.

Solid waste should be disposed at designated locations so that leaching and runoff can be prevented and not pass through the natural drainage system. Quarry and borrow areas should be reclaimed after use and the excavated areas should be back filled regularly. Hazardous waste generated by the Project should be suitably disposed off as per the regulations.

(2) Natural Environment

The entire corridor passes through semi arid part of Gangatic plain and Aravalli area which touches parts of Mewat, Rewari and Alwar. Gulistanpur Reserved Forest in Gautama Buddha Nagar District is approaching alignment. In the JNPT-Vadodara section, the proposed alignment runs parallel to the existing line near the SGNP and forest villages of Dahanu, Palghar and Vasai. The freight corridor traverses about 600 m away from the Tungareshwar Wildlife Sanctuary. Mangrove vegetation is in abundance at the JNPT and Panvel section. The SGNP and Tungareshwar Wildlife Sanctuary will not have impact due to this project. During the study it was also noticed that the alignment is left of the existing track towards highway in the outer part of the SGNP, therefore, wild animal and migratory paths will not be blocked while executing the Project. The implementation of timely mitigation measures would curtail the adverse impacts to other forest areas as well. Since

there will be tree cutting in the ROW along the alignment, it is suggested that it can be compensated by green belt development. The vegetative barrier would absorb both the noise and vibration caused by the movement of the freight trains along the corridor.

There should be strict implementation of the EMP while executing the Project. The tree cutting should be fulfilled by plantation and scrub areas of the forest villages should also be developed with plantation. Proper care should be taken at the mangrove areas.

(3) Social Environment

There was resentment of PAPs in the PCMs for ESIA study as well as Baseline Survey and Census for RRP. This was mainly due to lack of relevant compensation in the past government projects. The agricultural area will mainly be affected due to the proposed alignment. Residential areas in rural as well as in semi urban and urban areas (mainly in JNPT-Vadodara) is also being affected. There will be loss of agricultural land along the proposed corridor. ROBs and RUBs along the corridor should be well provided so that the local conveyance is less interrupted. Villagers are also very cautious for the safety, as the trains will be high speed which may increase the accidents. Fencing of the railway lines so that children and cattle cannot pass the corridor will be effective to avoid such accidents. The farmers also lose some of their basic facilities like the bore wells which comes directly under the ROW. Such problems need to be managed so that drinking water and irrigation problem does not arise. The construction of the Project would generate temporary employment to the local population. Many school are coming in the ROW, therefore, proper arrangement of study for the affected students should be done.

The implementation of the suggestions given by the local peoples during the PCMs and the recommendation given in the ESIA report should be followed up while executing the project with a regular monitoring of the progress by the Supervision Consultant, and DFCCIL.

2.2 RECOMMENDATIONS FOR RRP

(1) Coordinated Communication in the Land Acquisition Process

The Baseline Survey and Census took much longer time than initially planned and are not yet completed due to public resentment to land acquisition. In some cases, public resentment to land acquisition stems from the legacy of land acquisitions in the past which PAPs perceive to be unfair. Although DFCCIL is not involved in any of the past acquisitions, PAPs may see the ongoing work as an 'additional' effort to take their land. The fact that PAPs may have distrust and doubt about land acquisition in general in the first place should be noted when communicating with PAPs.

During the Baseline Survey and Census, the JST found that some PAPs are quite confused with different and even conflicting information they are provided. For example, one PAP in Thane district contacted the JST to confirm the degree of impact he will experience because he received conflicting information concerning his residence from different sources. Several changes in alignment have caused similar confusions, often resulting in frustration in the side of the affected. It is of great importance that all officers involved speak in one voice, particularly for sensitive issues such as the type and amount of compensation.

(2) Sufficient Information Disclosure in the Land Acquisition Process

It was found through the conducted PCMs for RRP that many PAPs had no knowledge on land acquisition process and even the Project. Thus, implementation of the PCMs for RRP was an important opportunity for the PAPs who attended the PCM to receive this information on the Project and its land acquisition. Adequate publicity should be given so that all PAPs know about the proposed land acquisition and the Project. Therefore, further information disclosure on the land acquisition process should be conducted immediately to cover such PAPs. In addition, it is suggested that in respect of some locations where objections to the land acquisition were raised strongly in the PCMs, further appropriate action should be taken by DFCCIL/MOR.

The JST suggests that if the gap between the land acquisition process and RRP is minimized, the PAPs' consent towards the land acquisition and resettlement can be reinforced and would make the administration of land acquisition and resettlement much smoother. Therefore, it is also recommended to finalise the RRP and disclose it to the PAPs as soon as possible.

(3) Secure of Compensation at Level of the Replacement Cost

The compensation rate under RAA 2008, which is calculated based on the governmental market rate, does not secure the compensation rate at the replacement cost and, in some cases, may be lower than the actual market price to purchase lost assets to be acquired for the project such as land and house with the same quantity and quality levels. To secure that the compensation rate is at the same level of the replacement cost, it is recommended that independent evaluator be hired by the Project or objective evaluation system be introduced under the DFC Project to check if there is a gap between the governmental compensation rate and the replacement cost. Furthermore, in the case where gaps found are wide and cannot be ignored from the viewpoint of livelihood recovery, it is suggested that necessary assistance should be examined and provided to such PAPs in addition to the provisions as per the RRP, which was prepared based on RAA 2008 and NRRP 2007.

In Maharashtra, the governmental resolution on appointment of committee to decide the rate of compensation for land to be acquired by DFCCIL in Maharashtra State (Maharashtra GR) was approved by the Maharashtra State government on 5th Sept. 2011 to determine the appropriate compensation for the PAPs in the land acquisition for the DFC Project. Though the resolution prescribes only the establishment and framework of the committee, it seems that expectation of PAPs is high to enable the PAPs to get suitable compensation. Therefore, it is suggested to prepare operational rules to determine the compensation rate under the committee and start its operation as soon as possible.

In addition, since DFC across a part of lands in Maharashtra, where public corporations acquire the land for their own development purpose such as JNPT and CIDCO, those lands will be transferred from such public corporations to DFCCIL. In such case, compensation rate for the land acquisition by other public corporations should be the same level as that of DFCCIL. Therefore, in the case where lower compensation is provided by the other public corporation to the PAPs than that of DFCCIL, additional compensation is required from the DFC Project.

In Gujarat, a CA of Surat District requested DFCCIL to review the compensation rate for Gujarati which is currently the compensation rate of Gujarat (jantri rate) at the time of 20A issuance (on 10 Feb 2011 for Gazette and 12 Mar. 2011 for newspaper for Surat District). Affected villagers expect the new jantri rate since it was revised on 1 Apr. 2011 just after

the 20A issuance and is doubled. This issue should be examined by DFCCIL further (see a letter from CA of Surat to DFCCIL dated 6th Jan. 2012 with a villagers' letter to the CA on the issue as shown in Attachment VII.2.1).

(4) Livelihood Assistance

Since the project area varies from the rural area and the urban area and socio-economic characteristics of the PAPs differ place by place in the extensive project area, it would be reasonable to provide the monetary assistance for the livelihood assistance. However, there are some potential concerns and recommendations regarding the livelihood assistance as shown below.

- 1) As MOR announced, it could be good to review whether a job provision to an affected PAP family can be added to the entitlement matrix since this is one of the most popular requests and this announcement is well known amongst PAPs according to the discussions of PCMs. Additionally, since it is announced officially by MOR, the same should be provided to the DFC Project in line with the MOR's railway project (see the MOR's Circular dated 16 July, 2011 and an article on actual application in Wet Bengal in a MOR's project as shown in Attachment VII.2.2.).
- 2) Since most compensation will be monetary only, it is important to make sure that the recipients will spend their compensation on livelihood assistance activities but not on irrelevant properties such as luxury goods and consumables so that they will not be worse off. To secure this, it is suggested to provide (1) certain educational workshops on how to plan their livelihood recovery and spend/save money and (2) actual assistance to open a bank account or to deal with any administrative procedure with a help from a local but experienced NGO or self-help organization which specializes in R&R implementation and/or community development.
- 3) There was a discussion between JICA and DFCCIL for Phase 1 in the past regarding additional livelihood assistance for Scheduled Caste (SC), and it was agreed that DFCCIL/MOR will provide additional assistance to SC PAPs, if any SC PAPs are identified to fall into vulnerable group or BPL category. Since the entitlement matrix shall be the same for Phase 1 and Phase 2, it is suggested to review whether the additional assistance for SC needs to be added to the entitlement matrix.
- 4) Though the compensation of wage loss for farmers is prescribed in the entitlement matrix of the RRP, compensation of wage loss for workers in the other sectors such as owners and employees working at the factory and office is not clearly described in the entitlement matrix. Since in the Baseline Survey and Census, it was identified that some factories and offices which land to be acquired for the Project, livelihood assistance for their business loss should be examined and provided in the case where land acquisition may cause temporary or permanent disturbance in their business activities.

(5) Further Care for STs as Indigenous People

Based on the result of Baseline Survey and Census, 662 ST households (approx. 4,200 PAPs) were found among the PAPs mostly in Gujarat and Maharashtra States. In India, ST is often recognized as indigenous people who would require special care for their lifestyle and livelihood. Therefore, supplemental survey is required to examine the specific impacts to those ST groups in the further land acquisition and resettlement process based on the result of the Baseline Survey and Census and additional information on their livelihood to be collected through direct consultation once the land acquisition and R&R implementation plan/schedule is fixed. In accordance with the impacts to be assessed, additional assistance and care should be implemented for those ST PAPs (e.g. more frequent public consultation and sensitization, assistance for administrative procedure,

provision of livelihood assistance in line with the existing state government programmes for STs, and periodical internal and external monitoring), if necessary. Further, there is possibility that ST be included in the PAPs who have not been surveyed due to some reasons such as refusal of the survey. Therefore, such ST should also be identified, when the supplemental survey is conducted.

In addition, during the PCM for the Fast Track RRP, it was found that ST participants in some areas were not able to understand the land acquisition and resettlement process and issues clearly and immediately due to their lower literacy level/educational level. Therefore, as a safety net, special and continuous care should be taken by DFCCIL to improve communication between the ST PAPs and DFCCIL as well as their understanding on land acquisition and resettlement process in the further stage.

(6) Implementation of Timely Monitoring and Follow-up Assistance

In addition to providing adequate compensation and assistance for land acquisition and relocation based on the RRP, it is suggested that monitoring the situation of livelihood recovery for PAPs is necessary through both internal and external monitoring process. In case where undesirable situation is found for livelihood recovery of the PAPs, additional assistance, especially during the transition period of the resettlement may be required. To implement adequate monitoring activity and provision of follow-up assistance, it is suggested that necessary institutional set-up be examined including the preparation of detailed monitoring plan for the RRP in further stage of the Project.