

TERMS OF REFERENCE

FOR

PREPARATION OF PROJECT AREA MAP

Of

Tripura JICA Project.



TRIPURA JICA PROJECT
Agartala
Tripura

Terms of Reference for “Preparation of Project Area mapping”

1. Purpose:

The prime objective of preparation of Project Area Map is to have a database that will act as the basis for identification and selection of target villages/mouza (Revenue villages are locally referred to as Mouza) and micro watersheds under the Tripura JICA Project (Tripura Forest Environmental Improvement and Poverty Alleviation Project) for intervention of Project activities. Also, it will serve as a baseline data for impact assessment of the project.

2. Objectives:

This will be carried out in 07 Forest Divisions / 04 WL Sanctuaries under the Project to acquire information on:

1. The sizes of degraded forest per Mouza covered under for target village selection.
2. The sizes of degraded forest per micro-watershed (micro-watershed as per the definition and delineation by the National (Natural) Resource Information System of ISRO or Central Water Commission (CWC)) for clustering of target villages.
3. The distance between the village settlements and degraded forests (1 km and 3 km) and geographical proximity among villages.
4. The distribution of target villages per Divisional Management Unit (DMU) and Range Management Unit (RMU).
5. The vegetation cover within the target Divisions for impact assessment purpose.
6. To develop the human resources of Tripura Forest Department on remote sensing and GIS technology

3. Target Area:

The project area covers Seven Forest Divisions and three Wildlife Sanctuaries over 7023 sq. Km area under the Tripura JICA Project.

4. Scope of Work:

1. Creation of digital GIS database for the data layers along with the source of data or responsibility for data input is mentioned in Table – I.
2. GIS overlay analysis for generation of land use/land cover class wise area statistics at individual micro-watershed and Mouza Level.
3. Creation of hard copy plots of land use/ land cover map overlaid with watershed and Mouza boundary at 1:50,000 scale.
4. GIS overlay analysis for generation of slope class wise area statistics at individual micro watershed and Mouza Level.
5. Creation of hard copy plots of slope class wise map overlaid with watershed and Mouza boundary at 1:50,000 scale.
6. Creation of attribute data in excel format.
7. On site training on operation and development of GIS database to the 20 officers of PMU/DMU

Table – 1 Data Layers required to be created:

GIS Data layers		Data Input
1	Land Use/ Land Cover Map	Satellite image of 2 seasons with vintage not older than year 2007
2	Slope Map (Digital Elevation Model (DEM))	Stereo-satellite images with appropriate spatial resolution considering the objective of the work along with DGPS data collection (Bidder can provide different options in both technical as well as financial proposal)
3	Watershed Boundary Map with details up to micro watershed	Satellite images and SOI maps as reference
4	Mouza Map	State level hard copy map prepared by Land Records Department, Tripura for digitalization of mouza boundaries and GIS layer creation
5	Forest Administrative Boundary Map	Relevant maps would be provided by TFD* for digitalization and GIS layer creation
6	Forest Boundary Map - Reserve Forest / Protected Forest	Relevant maps would be provided by TFD for digitalization and GIS layer creation
7	District/ Taluka Boundary Map	Relevant maps would be provided by TFD for digitalization and GIS layer creation.
8	Location map of habitation (hamlets) under the purview of the JBIC Tripura Project	Shall utilize Cartosat-1 images and/or LISS-IV Mx/Mono and/or IRS Pan images (Bidder can provide different options in both technical as well as financial proposal)

*TFD - Tripura Forest Department

Table – 2 Land use/ land cover classification scheme for the project:

Level – I		Level – II	Level - III
1	Built- up	a. Town/City/Urban	
		b. Village	
2	Agriculture	a. Fallow	
		b. Crop land	
		c. Plantations	a. Rubber
			b. Tea
c. Others			
3	Forest	a. Evergreen	a. Dense/Closed
		b. Deciduous	b. Sparse/Open
	c. Forest Plantations		c. Scrub/Forest
	d. Bamboo		d. Forest Bank
	e. Shifting cultivation(Jhum)	a. Old Shifting Cultivation	
		b. Abandoned Shifting Cultivation	
		c. Current Shifting Cultivation	
f. Crop land in Forest			
4	Waste Land	a. Culturable Wasteland with scrub	
		b. Culturable Wasteland without scrub	
		c. Unculturable Wasteland (gullied or ravenous land, barren hill ridge, rock, outcrop and others).	
5	Grassland	a. Dense	
		b. Degraded	
6	Water body	a. River/Stream	
		b. Reservoir/ Lake/ Pond	
		c. Canal	
7	Others		

5. Output / Deliverables:

All output data layers as mentioned in section-4 and table-1 of this TOR need to be delivered in both GIS compatible digital/soft copy and hard copy plots and on-site training as mentioned below:

1. Generation of Map Layout of land use / land cover map overlaid with watershed and Mouza boundary at 1:50,000 scale with appropriate legend displayed in the form of jpgs.
2. Generation of hard copy plots of land use/ land cover map overlaid with watershed and Mouza boundary at 1:50,000 scale.

3. Geo-referenced digital satellite images used for land use/ land cover mapping.
4. Land use area details (in hectares) shall be stored as attribute table of watershed as well as Mouza boundary map. Proper naming convention should be followed for defining the column headings within digital data base.
5. A tabular excel sheet with details of area statistics (in hectare) must also be provided for 'land use / land cover' and 'slope' classes with respect to both watersheds as well as Mouza level.
6. Generation of Map Layout of slope class map overlaid with watershed and Mouza boundary at 1:50,000 scale with appropriate legend displayed in the form of jpgs.
7. Generation of hard copy plots of slope class map overlaid with watershed and Mouza boundary at 1:50,000 scale.
8. Geo-referenced digital stereo satellite images used for creation of DEM and slope class should be made available to TFIPAP in GIS environment.
9. Slope class details (in hectares) shall be stored as attribute table of watershed as well as Mouza boundary map.
10. A tabular excel sheet with details of distance (in kilometers) of respective hamlet from forest land.
11. For quick reference purpose, a polygon 'shape' file showing extents of satellite images used for land use / land cover data creation along with details, such as date of image acquisition, path_row, sensor etc., to be provided as attribute information.
12. 20 trained PMU/DMU staff members

6. Projection System:

Topographical maps shall be first geo-referenced in parent projection system and the satellite images shall be geo-referenced w.r.t. them. The projection system of the output maps shall be in UTM with Datum as WGS84.

7. Data Format:

1. All digital database should be delivered to TFIPAP in digital/soft copy form of GIS Database (Geo-coded 'Arc Coverage' and 'Shape' format for Vector data, 'Grid' and 'img' format for Raster data) including map layouts and output results of analysis for day to day planning of the project and departmental activities, as well as better management of forest and for mid-term and impact assessment studies under TFIPAP.
2. Design of Map Legend, Symbology, file Naming Convention etc need a prior approval from the Project and successful bidder would be required to prepare and submit a sample before taking a final Plot, Map Layouts and jpeg.

8. Accuracy:

1. Planimetric accuracy of all the output data layers shall be within the RMS error of less than 2 pixels w.r.t. control points on Sol topo sheets.
2. Mapping accuracy should be 90/90 (>90% accuracy with >90 percent confidence level).

9. Timeline:

The work should be completed in all respect and output/deliverables need to be handed over to the Project Management Unit, Tripura JICA Project within 2 (Two) months time after the signing of agreement and date of issue of work order.

10. General Role & Responsibilities of Mapping Agency:

In addition to the above mentioned scope of work the general role & responsibility of mapping agency also include the followings:

1. The involvement of mapping agency will start from the time of signing the contract with Project Management Unit (PMU), TFIPAP and continue till all data layers are prepared and delivered by mapping agency and approved by PMU, TFIPAP.
2. To make sure that all data inputs provided by the project to the mapping agency for reference, satellite imageries procured, data created under the project is strictly confidential and it is the responsibility of the mapping agency to secure all such database.
3. To have sufficient storage place in the office to securely store all the supplies and output data.
4. Required to extend the necessary cooperation to the monitoring personnel from TFIPAP and other collaborating agencies, whenever required.
5. To provide the progress of the work to PMU on fortnightly basis, and as and when required that will include the details about the work completed, work in progress, future plan etc. with respect to the scheduled work plan.

11. Pre Qualification Condition:

The Organizations shall have the desired experience mainly:

1. Experience in cartography, GIS database creation, Remote Sensing (RS)/ multi-sensor and multi-date satellite image interpretation for land use / land cover mapping, ground truthing, creation of Digital Elevation Models and Spatial Analysis.
2. Experience in handling market leading GIS and Image Processing Software with sufficient number of legal licenses particularly of Arc GIS and Erdas Imagine software.
3. Experience of conducting trainings on methods of field data collection, detailed procedure of GIS database creation, functionalities of GIS, Remote Sensing and satellite image interpretation, for the field level forest officers including preparation of training materials.
4. Experienced technical staff conversant in 'Bengali' would be preferred, as it is be the medium of imparting training to the project field staff and the officials.

12. Procedure, terms and conditions:

1. After carefully reviewing the ToR, bidder shall place (i) Technical bid and (ii) Financial bid in the prescribed formats, complete in all respect along with all relevant credentials, in a separate sealed envelopes clearly super-scribing the contents “TECHNICAL BID for Preparation of Project Area Mapping” or “FINANCIAL BID for Preparation of Project Area Mapping” as the case may be along with the Name and Address of the Organization and putting both the envelopes in an OUTER envelope bearing the submission address and super-scribing "Bid for Preparation of Project Area Map for Tripura JICA Project" .
2. In case of consortium, all the agencies in the consortium shall submit a copy of documents mentioned in section ‘Enclosure’ of ‘Format for Technical Proposal’ (Annexure-A) with the joint proposal.
3. The bidders should submit their Proposal in the formats enclosed. For ‘Technical Proposal’, refer Annexure-A and for ‘Financial Proposal’, refer Annexure-B. Any deviations in the format may make the proposal liable for rejection.
4. An authorized representative of the firm must put his/her initials on all pages of the proposal. The representative’s authorization is confirmed by a written power of attorney accompanying the proposal.
5. A Bank Draft Rs 2000 (Rupees Two Thousand Only) drawn in favour of Director (A&F), Tripura JICA Project Agartala shall have to be enclosed with the Expression of interest so as to reach the Office as mentioned below within 3.00 P.M (IST) of the 5th December, 2008

<p>Director A&F Project Management Unit Tripura JICA Project Aranya Bhavan, Agartala 799006</p>

6. The Expression of interest shall remain valid for a period of 90 days from the date of opening of bids.
7. Submission of the Expression of interest and participation by an Organization shall be construed that the Organization agrees to abide by all the terms and conditions prescribed for the assignment. The decision of The Project Management Unit, Tripura JICA Project shall be final.
8. The Project Management Unit Tripura JICA Project reserves the right to modify the requirement at any time during the process of finalization of the Expression of interest.
9. The complete Proposal must be submitted so as to reach the office of the addressee as mentioned below on or before 3.00 P.M (IST) of the 5th December, 2008 (last date of receipt of Expression of interest) by registered/ courier post/ in person. The Offers received after the last date shall not be valid.
10. The Project Management Unit Tripura JICA Project Government of Tripura reserves the right to accept or reject any or all proposals including the lowest offer without assigning any reasons thereof and to add, modify or delete any of the terms and conditions without any notice.

Annexure-A:

Format of Technical Proposal for Preparation of Project Area Mapping

1. Name of the Organization:
2. Name and designation of Office bearer(s):
3. Full Postal Address, Phone/Fax, e-mail:
4. Branches & Presence in India (if any):
5. Registration Details and Financial turnover:

Financial Year	Total Turnover
FY 2005-06	
FY 2006-07	
FY 2007-08	

6. Experience in Remote Sensing based Land use / Land cover, Vegetation mapping:

Title of the Assignment	Name of the Client/ Donor/Funding agency	Specific objectives & outcome	Total value of the assignment	Duration of assignment	Salient features of the assignment

7. A list (with brief explanation) of past and present experience in key GIS projects:

Title of the Assignment	Name of the Client/ Donor/Funding agency	Specific objectives & outcome	Total value of the assignment	Duration of assignment	Salient features of the assignment

8. A list of key professionals employed by the firm(s) (permanent) with brief explanation of their qualifications and experiences:

Name of the Professional staff	Basic Qualification & Specialization	Experience in the area of the assignment	Designation in the assignment and commitment for involvement

9. Description of Methodology:

- (a) Detailed proposed methodology with details of suitable available options of input data
- (b) Detailed Work Plan and scheduler with Milestones
- (c) Estimates of the Total Staff Effort to carryout the Assignment. (NOTE: NO FINANCIAL /COST DETAILS TO BE PROVIDED IN TECHNICAL PROPOSAL). Provide details about proposed composition of team.

10. Any other relevant information:

11. Enclosures:

- (a) CV's, recently signed by the proposed professional staff considered for this assignment
- (b) Profile of Organisations/Agencies/Firms Annual reports (Most recent)
- (c) Copy of last three year's audited statement of Accounts
- (d) Copy of registration certificate
- (e) Any other relevant document(s) (please list)

Date:
Bearer

Name and Signature of the Office

Place:

Designation

Annexure-B:

Format of Financial Proposal for Preparation of Project Area Mapping

(This format must be kept in a separate sealed envelope clearly marked as “Financial Proposal”)

Name of the Organization:

A. Data Creation and Analysis				
Items	Quantity	Unit	Unit Price	Total
Land use / land cover		Man days		
Digital Elevation Model		Man days		
Micro-Watershed Boundaries		Man days		
Village/ Mouza map		Man days		
Forest Administrative Map		Man days		
Forest Boundaries-RF/PF		Man days		
District/ Taluka Boundaries		Man days		
Location map of Hamlets		Man days		
Analysis and Statistics generation		Man days		
Total			-	

B. Data Input				
Items	Quantity	Unit	Unit Price	Total
Satellite Image – LISS-III		Number		
Satellite Image – Pan		Number		
Stereo-Images for DEM		Number		
DGPS Survey Data for Geo-referencing		Number		
Total	-	-	-	

C. Field Allowance				
Items	Quantity	Unit	Unit Price	Total
Remote Sensing Expert		day		
Surveyor		day		
Trainer		day		
Total				

D. Transportation Cost				
Items	Quantity	Unit	Unit Price	Total
RS Expert for ground truthing		day		
Surveyor for DGPS data collection		day		
Trainer for Training		day		
Total				

E. Other Direct Cost				
Items	Quantity	Unit	Unit Price	Total
Generation of Map Plots		Lump sum		
Training Material		Lump sum		
Other (please specify)		Lump sum		
Total				

Sub Total of A,B,C,D,E				
Service Tax				
Grand Total				

Date:
Place:

Signature with Name of the authorised Signatory
Designation

Additional Options for Land use/Land cover and DEM				
Items	Quantity	Unit	Unit Price	Total
Land use / land cover data creation		Man days		
Satellite image cost		Number		
Digital Elevation Model		Man days		
Stereo-Image cost		Number		

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