

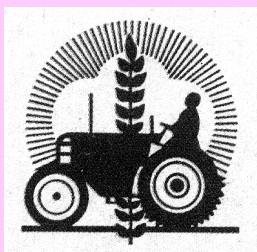
Updated Final Report

**COMPREHENSIVE ENVIRONMENTAL STUDIES ON TIPAIMUKH
HYDRO-ELECTRIC (MULTI-PURPOSE) PROJECT**

**EXECUTIVE SUMMARY
FOR
ENVIRONMENTAL MANAGEMENT PLAN
(VOL- II)**

Submitted for:
**NORTH EASTERN ELECTRIC POWER CORPORATION LIMITED
SHILLONG, MEGHALAYA**

By



**AGRICULTURAL FINANCE CORPORATION LTD., MUMBAI
Northern Regional Office, New Delhi, (H.O. Mumbai)**

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EXECUTIVE SUMMARY

PART-1 : ACTION PLAN FOR CATCHMENT AREA TREATMENT

I. Management Plan

1. The major environmental issues for the Tipaimukh Catchment revealed on the basis of EIA study are as under:

- a) Necessity of integrated approach to protect the environment through suitable measures to prevent or to mitigate the adverse impacts on prevailing bio-diversity,
- b) Watershed management for soil conservation and stabilization,
- c) Formulation of suitable cultivation practice to reverse rapid deforestation, and
- d) Involvement of local communities and indigenous people for long term comprehensive environmental planning and management.

(CH-I.1)

2. An area of 893.0 sq km has been found necessary to be treated, based on interpretation of related thematic maps developed from satellite imageries. Besides, the entire area of 64.6 sq km under current jhum will have to be protected from erosion by converting these into permanent cultivable land through Jhum Management Schemes.

(CH-I.3)

3. Conservation and Management measures suggested for the above mentioned areas are:

- a) Through Intensive Afforestation–Reforestation, Enrichment Planting and Creation of Green Belt

Open Forest	7.0 sq km
Degraded Forest	32.0 sq km
Current Jhum	19.0 sq km
Abandoned Jhum	<u>26.0 sq km</u>
	84.0 sq km

- b) Through land based Conservation-cum-Production Schemes for shifting cultivation areas:

Current Jhum	45.6 sq km
Abandoned Jhum	<u>21.0 sq km</u>
	66.6 sq km

- c) Through Engineering-Mechanical Measures for excessively eroded and vulnerable areas:

Scrub Land	133.0 sq km
Barren Rocky Land	<u>47.0 sq km</u>
	180.0 sq km

- d) Protection by Vegetative Hedge for isolated patchy areas under very severe, severe and high categories of soil erosion status:

Open Forest	105.0 sq km
Degraded Forest	344.0 sq km
Scrub Land	132.0sq km
Barren Rocky	<u>46.0sq km</u>
	627.0sq km

(CH-I.4)

4. Forestry and Silvo-Pastoral Management is suggested specially towards afforestation against forest land (both RF and USF) to be submerged both in Manipur and Mizoram States by creating a Green Belt along the periphery of reservoir and treating few identified Critical and Vulnerable Areas. Area identified are:

In Manipur State	7900 ha
In Mizoram State	500 ha

Target for Afforestation-Reforestation Programme, has been kept at 7 years

(CH-I.5)

5. Species suggested for afforestation / re-forestation are:

A Plantation in RF, PF and USF :

- i) Upto altitude of 1000 m (Lower Hills) : ***Tectona grandis***,
Terminalia myriocarpa ***Gmelina arborea***, ***Chukrassia***

tabularis, Dipterocarpus turbinatus / macrocarpus, Schima wallichii, Michelia champaca, Toona ciliata, Lagerstroemia speciosa etc.

ii) Between 1000 m to 1500 m (Middle Hills) : *Bucklandia populnea, Terminalia myriocarpa, Betula cylindrostachys, Eucalyptus saligna, Cupressus cashmeriana, Pinus kesiya* etc.

iii) Above 1500 m : *Bucklandia populnea, Alnus nepalensis, Castanopsis* sp and *Pinus patula*

B. Plantation in Green Belt Along the Reservoir :

Terminalia myriocarpa, Chukrassia tabularis, Gmlina arborea, Albizzia procera and lebbeck, Melia azaderach, Duabanga grandiflora, Parkia roxburghii, Eucalyptus etc.

C. Plantation in Low Lying Areas Liable to Temporary Submersion :

Dalbergia sissoo, Lagerstroemia speciosa, Pangamia pinnata, Bischofia javanica and Salix tetrasperma etc.

D. Plantation in Abandoned Jhum Areas : *Macaranga denticulate, Duabanga grandiflora, Betula cylindrosatchys, Acacia auriculiformis, Eucalyptus, Pinus kesiya* etc.

(CH-I.5)

6. Plantation cost based on minimum labour wage rate of Rs. 75/- per manday, as per both Manipur and Mizoram States, will be Rs. 20,000/- per ha. Thus, total cost works out to:

For Manipur Catchment = 7900 ha x Rs.20,000/-	Rs. 1580.00 lakh
For Mizoram Catchment = 500 ha x Rs. 20,000/-	Rs. 100.00 lakh
Total	Rs. 1680.00 lakh

(CH-I.5)

7. Integrated Strip Farming System has been suggested against Land based Conservation-cum-Production Scheme of shifting cultivation areas. One unit of 11 strips of 20 m wide and 100 m length will cover 220 ha. Thus, altogether 3027.0 units will be required to tackle 6660 ha.

Agricultural crop will be grown on 3027 ha where as Silvi-Horticultural crop will be grown on 3633 ha. Staggered trenches will be provided in Silvi-Horticultural Crop strips and Vegetative Hedge will be provided in Cover and Mixed Crop strips. Total financial involvement works out to Rs. 283.14 lakhs (Rs. 252.43 lakhs for Manipur and Rs. 30.71 lakhs for Mizoram). Target to complete this programme has been kept for 5 years.

(CH-I.6)

8. Gully Control Structures as well as Contour and Staggered Trenches, alongwith development of pasture and fodder grasses in patchy erosive and vulnerable areas, have been suggested for Engineering-Mechanical Measures. The former will protect 10,800 ha where as the later will look after 7200 ha, totaling 18,000 ha. In all, 18 gullies could be identified in 12 sub-watersheds. To control these, 10 numbers Loose Boulder Check Dams and 18 numbers Double Row Post Brush Dam have been suggested. Financial involvement against Engineering – Mechanical Measures Works out to Rs. 199.02 lakhs (Rs. 126.05 lakhs for Manipur and Rs. 72.97 lakhs for Mizoram). Target, in this case also has been kept for 5 years.

(CH-I.7)

9. Growing of Vetiver Grasses has been suggested for Erosion Control Through Vegetative Barriers. To cover, 62,700 ha of isolated patchy areas under very severe, severe and high categories of soil erosion status, the estimated cost works out to Rs. 437.10 lakhs (Rs. 403.0 lakhs for Manipur and Rs. 34.10 lakh for Mizoram). Target to achieve this has been fixed at 5 years.

(CH-I.8)

10. To predict probable SPR from catchment after the implementation of all suggested measures, the USLE has been applied. The predicted value works out to 0.01 ha m / sq km / yr as against present SPR of 0.038 ha m / sq km / year.

(CH-I.9)

II. Training Programme and Community Involvement

11. A number of training programmes have been suggested for the inhabitants of the catchment villages as well as for the oustees, to ensure efficient implementation of various treatment schemes. These are:

- a) to create awareness on hazardous affects of jhum cultivation vis-à-vis highly profitable integrated strip farming sytem,
- b) training on integrated approach for management of agriculture, horticulture, silivi-pasture, selection of crops / varieties etc,
- c) training on soil and water conservative in hills, hill slopes, terraced lands etc,
- d) management and upkeeping of livestock,
- e) training on weaving, designing, handicrafts, mushroom cultivation etc.

The programme will impart training to 2550 trainees over a period of 3 years. The estimated cost works out to Rs. 21.77 lakhs which is apportioned at Rs. 20.00 lakh for Manipur and at Rs. 1.75 lakh for Mizoram.

(CH-II)

III. Project Implementation and Management

12. It is suggested to constitute two bodies, viz (1) Tipaimukh Catchment Area Co-ordination Committee (TCACC) and (2) Project Implementation Authority (PIA), under the administrative control of MOE&F, NE Regional Office, for affective implementation of various action plans. A provision of R. 14.0 lakh, i.e Rs. 13.0 lakh for Manipur and Rs. 1.0 lakh for Mizoram, to be incurred over a period of 7 years (construction period) has been made.

(CH-III)

PART-2 : ENVIRONMENTAL MANAGEMENT PLAN

IV. Geo Environmental Management

13. As a part of Geo Environmental Management Plan, monitoring for seismic risk hazard has been suggested in the project sites as well as in the reservoir area. A provision of 79.04 lakh has been kept for this purpose, to be incurred over a period of 3 years.

(CH-IV)

V. Action Plan for Treatment of Landslide Prone Areas

14. Geomorphic elements identified in the reservoir rim are:

- | | |
|---------------------------|---|
| a) Structural Landforms | (i) Structural or Homoclinal Ridge (ii) Hogbacks, (iii) Flatirons, (iv) Anticlinal Ridges, (v) Synformal Valleys, (vi) Antiformal Valleys and, (vii) Symformal Ridges |
| b) Denudational Landforms | (i) Denudational Hills / Ridges, (ii) Landslides and, (iii) Escarpments |
| c) Depositional Landforms | |

(CH-V)

15. Two major natural landslides, one at Tolbunghat and the other at upstream of Tolbunghat and at an higher altitude, exist within the reservoir spread. In addition, another two landslides, caused due to human activities during construction of roads, fall within the reservoir spread.

(CH-V)

16. For immediate checking of slided material into the reservoir, afforestation and turfing have been suggested. However, detailed geotechnical studies will be necessary for detailed stabilization measures. A lump sum provision of Rs. 10.0 lakh has been made in EMP estimate for meeting up initial expenditures on these works.

(CH-V)

VI. Human Environment

17. No specific disease endemic to submergence areas are known. However, Malaria is a major vector transmitting disease found here, alongwith other water borne diseases like Cholera, Typhoid, Paratyphoid, Infective hepatitis, Bacillary dysentery, Amoebic dysentery, Gastroenteritis, Skin sepsis and Ulcers, Scabies and Diarrhoeal diseases.

(CH-VI)

18. As a provision of Rs. 125.40 lakhs has been made in R. R. Plan towards PHCs and Mobile Ambulatory Clinics, no separate fund for health care has been provided in the EMP estimate.

(CH-VI)

19. It is proposed to provide Kerosene, Electric Power etc to the labour force at subsidized rate and thus, a lump sum provision of Rs. 14.00 lakhs, for the total construction period of 7 years, has been kept in the estimate.

(CH-VI)

VII. Reservoir Fisheries Development

20. To motivate reservoir fisheries development by lacustrine type fish varieties suitable to this region, and to introduce cage culture, a provision of Rs. 20.00 lakhs has been kept.

(CH-VII)

VIII. River Transport at the Upstream Reaches

21. Annual fluctuation of reservoir water will be from FRL (El 175.0 m) and MDDL (El 136.1 m). This will provide a backwater zone along R. Barak, R. Makru, R. Irang and R. Tuivai for a total length of 360 km during FRL stage and of 300 km during MDDL stage. Such facility will allow navigation to all upstream villages, most of which are inaccessible now due to poor and lengthy road communication. As this

will be an extra facility that could be availed of from the project, no financial provision has been kept in EMP estimate.

(CH-VIII)

IX. Dam Break Analysis and Disaster Management Plan

22. Dam Break Analysis was conducted by CWC, New Delhi, using mathematical simulation model (MIKE-II Software) and the result indicates that :

- i) maximum discharge through the breach is found to be 3,10,873 cumec, which occurs 105 hr 10 min after impinging of flood hydrograph into the reservoir,
- ii) maximum water level varies between 134.48 m at Ch. 0.0 km (dam axis) to 23.62 m at Ch. 224.44 km (Indo-Bangla border),
- iii) there is a steep drop of water level at Ch. 75 km (near Lakhipur / Fulertal) which depicts actual topographical feature of down stream valley, as the river traverses upto Ch. 75 km confined within gorge and there after valley begins. Consequently, water volume spreads resulting in steep drop of water level, inundating larger valley area,
- iv) area to be inundated upto Indo-Bangla border works out to be 1975.8 sq km and maximum depth of water level below Lakhipur varies from 9.0 m (near Lakhipur) to 5.5 m (near Indo-Bangla border).

(CH-IX)

23. For Disaster Management Plan, a Flood Forecasting Network has been suggested, apart from raising and strengthening existing dykes / embankments for providing shelter to human and animals till the water level comes down.

(CH-IX)

24. Also a Disaster Management Committee has been suggested to work during emergency.

(CH-IX)

25. A financial provision of Rs. 82.50 lakhs has been kept towards Flood Forecasting Network.

(CH-IX)

X. Plan for Dumping of Excavated Materials and Restoration of Borrow-Quarry Areas

26. Major Components of the project involving excavation and tunneling are:

- i) Rockfill Dam, 162.8 m high,
- ii) Diversion arrangement by 2 Cofferdams and 2 Tunnels of 12.5 m dia each, totaling 1750 m length,
- iii) Chute-cum-Tunnel Spillway with rectangular inlet of size 90.6 m (W) x 714 m (L) followed by 4 Tunnels of 11.0 m dia each, totaling 1440 m length,
- iv) Two HRTs of 13.0 m dia each, totaling 1090 m length,
- v) Two Surge Shaft with internal dia of 30.0 m each,
- vi) Two Pressure Tunnels of 13.0 m dia each, totaling 478 m length and 6 Penstocks of 5.5 m dia each, totaling 1200 m length and with Bulk Head Gates,
- vii) Surface Power House of 286 m (L) x 55.5 m (W) x 51.5 m (H),
- viii) Adit Tunnels (460 m long) and Switch yard.

(CH-X)

27. Geology at the Dam Site is:

- i) Surma Group of rocks of Miocene age, well bedded to massive argillaceous sandstones with inter-calations of shales,
- ii) Three broad litho-units present are:
 - Massive Sandstone Unit
 - Alternate Sandstone Unit and Siltstone / Claystone Unit
 - Predominant Claystone Unit

- iii) On river bed, over burden extends upto a depth of 38.0 m and rock is available at 15.0 m below MSL.

(CH-X)

28. Class-wise Quantity of Excavated Materials as Estimated are:

- | | |
|---------------------------------|---------------------------------|
| i) Ordinary Soil | $2.6274 \times 10^6 \text{m}^3$ |
| ii) Soft and Disintegrated Rock | $4.3496 \times 10^6 \text{m}^3$ |
| iii) Hard Rock | $5.4385 \times 10^6 \text{m}^3$ |
| iv) Tunnel Boring | $1.1955 \times 10^6 \text{m}^3$ |

(CH-X)

29. Out of above, usable and un-usable quantity, as per CSMRS, New Delhi's test result will be :

- | | |
|---------------|---------------------------------|
| i) Usable | $2.886 \times 10^6 \text{m}^3$ |
| ii) Un-usable | $10.725 \times 10^6 \text{m}^3$ |

(CH-X)

30. Recommended dumping sites and quantity, as found best suited are :

- | | |
|---|---------------------------------------|
| i) Sipikawn Saddle Borrow Area, Site No. I | $5.0598 \times 10^6 \text{m}^3$ |
| ii) Ronglui Nala-II Quarry, 16 km from
Tipaimukh, Site No. II | $5.5915 \times 10^6 \text{m}^3$ |
| iii) Ronglui Nala-III Quarry, 18 km from
Tipaimukh, Site No. III | $0.0773 \times 10^6 \text{m}^3$ |
| | <hr/> $10.725 \times 10^6 \text{m}^3$ |

(CH-X)

31. Protection of dumping yard and restoration plan for borrow and quarry areas, as suggested are:

- By vegetative cover (creation of Green Belt), by Intensive Afforestation and Reforestation with selected plant species,
- Filling up of depressions by un-usable excavated materials and also by transporting soil materials from nearby areas, without disturbing the slopes,

iii) By vegetative cover through intensive afforestation and reforestation programme.

(CH-X)

32. Financial Outlay :

A sum of Rs. 156.0 lakh will be required for intensive afforestation and reforestation to be spent over a period of 6 years.

(CH-X)

PART-3 : RELIEF AND REHABILITATION PLAN

XI. Introduction

33. The proposed Tipaimukh Dam Site is located at 500 m down stream of the confluence point of R. Tuivai with R. Barak, in Manipur – Mizoram Border.

(CH-XI)

34. The project envisages construction of a 162.8 m high rock fill dam to generate hydro-power to the tune of 1500 MW (installed capacity)

(CH-XI)

35. Submergence areas below conservation levels are:

State	Submergence Areas (sq km)	
	Below EI 175.0 m (FRL)	Below EI 178.0 m (MWL)
Manipur	275.50 (94.5%)	286.20 (94.4%)
Mizoram	16.00 (5.5%)	17.00 (5.6%)
Total	291.50	303.20

(CH-XI)

36. Field survey has been conducted following GOI's guidelines for acquisition – requisition of lands and structures, which is : all land acquisition will be done upto FRL, where as all villages situated below MWL should be rehabilitated and resettled.

(CH-XI)

37. The R R Plan has been drawn up following guidelines from (i) National Policy, Packages and Guidelines for Resettlement and Rehabilitation, 1998 (Draft), (ii) Modified Draft National Policy for Resettlement and Rehabilitation of Persons Affected by Reservoir Projects and (iii) Recommendation on National Policy on R. R. for PAFs, 2003.

(CH-XI)

38. Data collection from primary sources has been done in phases and in collaboration with NGOs, assisted by AFC's supervisor.

(CH-XI)

XIII. General Profile of the Basin, Affected States and Districts

39. The reservoir spread at MWL is contained within Tamenglong and Churachandpur districts of Manipur State and Aizawl district of Mizoram State.

(CH-XIII)

XIV. Profile of the Affected Villages

40. 12(Twelve) villages in Manipur State, i.e 7 in Tamenglong district and 5 in Churachandpur district, are situated below MWL and will need rehabilitation and resettlement. Total PAFs and PAPs are 313 and 2027 respectively.

(CH-XIV)

41. **NO** inhabited village in Mizoram State is coming under submergence (situated below MWL).

(CH-XIV)

42. Only landed and plant properties of 4376 owners, belonging to 77 villages in Manipur State, will be affected. However, as their affected land is practically 30% of total land, they can not be considered as PAFs or PDPs.

(CH-XIV)

Similarly, only landed and plant properties of 14 villages in Mizoram State, belonging to 340 owners, will be affected, though no village will be submerged.

(CH-XIV)

43. Abstract of Fully Submerged and Only Property Affected Villages are thus:

Sl. No.	Particulars	Manipur	Mizoram	Total
FULLY SUBMERGED VILLAGES				
1.	Village (Nos.)	12	-	12
2.	Total Family (Nos.)	313	-	313
3.	Total Population (Nos.)	2027	-	2027
4.	Land			
	▪ Village Land (ha)	2400	-	2400
	▪ Garden Land (ha)	80.08	-	80.08
	▪ WRC Land (ha)	87.44	-	87.44
	▪ Pond and Other Land (ha)	5.19	-	5.19
	▪ Forest Land (ha)	21,952.64	-	21,952.64
ONLY PROPERTY AFFECTED VILLAGES				
5	Village (Nos.)	77	14	91
6.	Nos. of Owners	4376	340	4716
7.	Land			
	▪ Garden Land (ha)	1391.75	111.0	1502.75
	▪ WRC Land (ha)	1632.90		1632.90
	▪ Forest Land (ha)		1489.0	1489.0

(CH-XIV)

44. As per guidelines laid down under Rehabilitation Policies, R. R Packages should be framed for 557 families which includes (i) married sons now living with parents, (ii) unmarried adult sons and daughters now living with parents, along with original PAFs.

(CH-XV)

XV. Rehabilitation Plan

45. To accommodate 557 families from 12 oustee villages, 6 rehabilitation sites have been proposed. These 6 villages could be selected out of suggested 34 villages so that finalisation can be made by the PAFs on the basis of available amenities.

(CH-XV & XVI)

XIV. Relief and Rehabilitation Packages

46. Amount of compensation to be paid against personal properties and village infra-structures, including acquisition cost of project utility areas and land for relocation of road have been included in the project estimate under sub-head B-Land and other relevant sections of project cost estimate, which has been approved by Gol. Thus, no separate provision has been kept in R. R. Plan.

(CH-XVI)

47. Land requirement for (i) Fully Submerged Villages and (ii) Only Property Affected Villages will be:

Sl. No.	Type of Land	Manipur (ha)	Mizoram (ha)	Total (ha)
1.	Village Land	112.0	-	112.0
2.	Agricultural Land - for fully submerged villages	1114.0	-	1114.0
3.	Horticultural Land - for fully submerged villages	557.0	-	557.0
4.	Grazing Land	27.0	-	27.0
5.	Forest Land			
	i) Reservoir Area	43,905.28 (21,952.64 ha x 2)	2978.00 (1489 ha x 2)	46,883.28
	ii) Project Utility Area	3760.00 (1880.00 ha x 2)	100.00 (50.00 ha x 2)	3860.00
	iii) Approach Road (Tuirial HE Project to Tipaimukh HE (M) Project)		195.00 (97.50 ha x 2)	195.00
	iv) Land for Relocation of Road	970.00 (485.00 ha x 2)	25.20 (12.60 ha x 2)	995.20
	v) Land for Rehabilitation of PAFs	3566.00 (1783.00 ha x 2)	--	3566.00

(CH-XVI)

XVIII. Income Generation and Employment Benefits

48. Besides, physical and economic rehabilitation packages, a training programme has also been suggested for upliftment of the socio-economic conditions of the residents of affected villages so that annual income to the tune of Rs. 50,000/- to Rs. 55,000/- could be generated per family against present average annual income of Rs.33,000/-.

(CH-XVIII)

XIX. Project Implementation and Monitoring

49. Two bodies, viz. Project Implementation Authority and Project Monitoring Committee, have been suggested for efficient management and monitoring of the rehabilitation programme.

(CH-XIX)

XX. Total Financial Outlay

50. Total Financial Involvement for the proposed R. R. Programme, for both Manipur and Mizoram States, works at to Rs. 64.56 crore as per following break up:

(Rs. in lakhs)

Sl. No.	Item	Manipur	Mizoram	Total
1.	Physical Rehabilitation	5516.50	-	5516.50
2.	Economic Rehabilitation	55.80	-	55.80
3.	Training	11.40	-	11.40
4.	Project Implementation and Monitoring	30.00	-	30.00
5.	Price & Physical contingency	842.06	-	842.06
	Total	6455.76	-	6455.76

(CH-XX)

51. The above amount would be spent over a period of 4 (four) years. Yearwise phasing will be :

Year	Amount in Lakh		
	Manipur	Mizoram	Total
I	960.22	-	960.22
II	1911.82	-	1911.82
III	1950.46	-	1950.46
IV	1633.26	-	1633.26
Total	6455.76	-	6455.76

(CH-XX)

PART-4: COMPENSATORY AFFORESTATION AND BIO-DIVERSITY PRESERVATION

XXI. Compensatory Afforestation

52. A total area of 55,499.48 ha is found to be covered by compensatory afforestation, of which 52,201.28 ha pertain to Manipur and 3298.20 ha pertains to Mizoram.

(CH-XXI)

53. Locations for compensatory afforestation have been suggested in degraded RFs, viz. (i) Jiri-Makru RF, (ii) Irangmukh RF, (iii) Vangai RF, and (iv) Tolbung RF in Manipur and (v) Tuivai Riverine RF, (vi) Tuirial Riverine RF, (vii) Chalfilh RF, and (viii) Tawi RF in Mizoram.

(CH-XXI)

54. Financial involvement works out to be Rs. 10,440.26 lakhs for Manipur and Rs. 659.64 lakhs for Mizoram, totaling Rs. 11,099.90 lakhs.

(CH-XXI)

XXII. Bio-Diversity Preservation

55. To compensate bio-diversity loss, 2 (two) Botanical Gardens have been suggested, one at Manipur covering an area of 1.50 sq km and the other at Mizoram covering an area of 0.50 sq km.

(CH-XXII)

56. For this purpose, a provision of Rs. 80.0 lakhs for Manipur and Rs. 20.0 lakhs for Mizoram has been kept in the estimate. This includes maintenance for 5 years.

(CH-XXII)

PART-5 : DEVELOPMENT OF TOURIST CENTRE AND ANCILLARIES

XXIII. Tourism Development

57. As the reservoirs are best chosen for recreation centers, development of infra-structural network alongwith creation of Landscape, Rocky

Park, Ornamental Belt and Garden, Parkland, Green vistas, Tree belts, grooves etc, together with opportunities for boating, canoeing, water sports, sport fishing etc at Tipaimukh, are suggested. Also, keeping in view of tourist inflow and duration of halt, development of two Base Towns, one at Thanlon and the other at Nungba, is suggested. A provision of Rs. 500.00 lakhs has been kept in the estimate for this purpose.

(CH-XXIII)

PART-6 : FINANCIAL OUTLAY

XXIV. Financial Outlay

Total estimated cost towards Comprehensive Management Plan works out to Rs. 211.52 crores

Part	Sl. No.	Sector	Phasing (Years)	Sectoral Financial Outlay (Rs. in lakh)			Reference
				Manipur	Mizoram	Total	
1		CATCHMENT AREA TREATMENT PLAN					
	i)	Forestry and Silvi-Pasture Management	7 + 3	1580.00	100.00	1680.00	Annexure-1.1
	ii)	Alternate Landuse Programme to Control Shifting Cultivation	5	252.43	30.71	283.14	Table-1.9 & 1.10
	iii)	Soil and Water Conservation (Engineering – Mechanical Measures)	5	126.05	72.97	199.02	Table-1.13 & 1.14
	iv)	Erosion Control through Vegetative Barriers	5	403.00	34.10	437.10	Para – 1.8.2
	v)	Training Programme	3	20.00	1.77	21.77	Para- 2.3
	vi)	Project Implementation and Management etc.	7	13.00	1.00	14.00	Para-3.4
		Total of C A T Plan	-	2394.48	240.55	2635.03	

Part	Sl. No.	Sector	Phasing (Years)	Sectoral Financial Outlay (Rs. in lakh)			Reference
				Manipur	Mizoram	Total	
2	ENVIRONMENT MANAGEMENT PLAN						
	i)	Geo-Environmental Management	3	-	-	79.04	Para-4.1.6
	ii)	Initial Treatment and Systematic Geo-technical Study of 4 Landslide Zones within the Reservoir Area	2	-	-	10.00	Para-5.5
	iii)	Human Environment	7	-	-	14.00	Para-6.3
	iv)	Reservoir Fisheries Development	2	-	-	20.00	Para-7.13
	v)	Disaster Management Plan	-	-	-	82.50	Para-9.6.1
	vi)	Plan for Dumping of Excavated Materials and Restoration of Borrow-Quarry Area	6	-	-	156.00	Para-10.14
Total of E M Plan			-	-	-	361.54	
3	RELIEF AND REHABILITATION PLAN		4	6455.76	-	6455.76	Table-20.1
4	COMPENSATORY AFFORESTATION						
	i)	Towards Diversion of Forest Land for Non-Forest Purposes		10,440.26	659.64	11,099.90	Para-21.5
	ii)	Towards Bio-diversity Loss		80.00	20.00	100.00	Para-22.3
Total of Compensatory Afforestation			-	10,520.26	679.64	11,199.90	
5	DEVELOPMENT OF TOURIST CENTRE AND ANCILLARIES					500.00	Para-23.2
6	GRAND TOTAL OF FINANCIAL OUTLAY					21,152.23	
						Say	211.52 crores

(CH-XXIV)
