(9)

S. No. 20 of 1999-2000

Government of India
Central Water Commission

Note for consideration of the Technical Advisory Committee of Ministry of Water Resources

Name of the project:-	**Swan River Flood Management & Integrated Land Development Project in Distt Una. H.P. Phase-I**

New Delhi
October, 1999

Note on "Swan River Flood Management & Integrated Land Development Project in District Una (Himachal Pradesh) - Phase-I" for consideration of T.A.C. of Ministry of Water Resources, Government of India -
Estimated Cost Rs 102.72 crores
B.C.Ratio : 1.42:1

1.0 : **Introduction.**

District Una is situated in the Himalayan foothills covering an area of 1540 sq. km. and lies in South Western part of Himachal Pradesh. It is bounded by Kangra, Hamirpur & Bilaspur district of Himachal Pradesh in North, East, South & Hoshiarpur district of Punjab in West respectively.

Swan river flows in the heart of mountaineous valley of Una district. Its catchment, provides sustenance to large population of Una district and regulates water and sediments in the downstream areas and is in the State of retrogression spelling big environmental and socio-economic catastrophe in near future.

Agriculture is the only means of livelihood for majority of the population. Socio-Economic structure has got the worst set back in the past due to floods in the Swan river. Whole of Una valley has got vast potential for agriculture, horticulture, forestry, industry and fish culture development.

Swan River Flood Management & Integrated Land Development Project was prepared by the State Govt. and submitted to Central Water Commission for techno-economic appraisal and investment clearance of Planning Commission in April, 1998. The project report is now placed for consideration of T.A.C.

2.0 : **Problem.**

Swan river originates from Joh-Marwari village ~~Dangoh~~ near Daulatpur Chowk in Amb tehsil of district Una. The total length of Swan river is 85 km, out of which 65 km is in Himachal Pradesh. On its course, it is joined by around 78 tributaries both from left and right. Swan river is a rainfed aggrading and and flashy type of river. Almost all the villages except those in Bangana tehsil of district Una are affected by these tributries. The width of river varies from less than 1 km to 4 km in-different reaches.

Catchment of Swan river consists of fragile and badly vulnerable Shivalik hills supporting hardly any vegetative cover. The tract is heavily honeycombed by private cultivators, which is the main stay of local population. Major part of catchment area of Swan river is under private ownership. It keeps changing its course frequently during rains, brings heavy sediment which spreads on fertile agricultural land on either side. Abrupt and flashy discharge in the catchment during the monsoon causes heavy floods in the Swan river, thereby causing large scale erosion of land, damage to property, crops, contamination of water and food, disruption of communicaiton, loss of human and cattle life and continuous fear, anxiety, distress in the minds of people.

Floods of 1978, 1988 had created havoc in the area. There had been abnormally heavy rainfall from 22nd to 27th September, 1988. A total of 842.6 mm of rainfall had observed on 26th of September, 1988 and flood in the Swan river was of the order of 6402.44 cumecs. The flash floods resulted in heavy landslides, destroyed standing crops completely and caused huge losses to public & private property. Thirty seven persons lost their lives and many more were missing. Forty Five cattle heads perished. The maximum rainfall in different years are tabulated below :

S.No.	Year	Date	Maximum Rainfall (in mm)
1.	1988	24-9-88	323.80
	1988	27-9-88	262.80
2.	1991	4-8-91	100.00
		8-8-91	132.00
3.	1992	16-8-92	126.40
4.	1993	11-7-93	188.00
		12-7-93	156.20
5.	1994	20-7-94	185.60
6.	1996	14-8-96	126.00

3.0 : **Remedy.**

In the 1st Phase, a length of 16.67 km of Swan river in the lowest reach i.e from Santokhgarh to Jhalera bridge having a bed slope of 1:1160 and width varrying from 2040 to 2300 Mtrs. has been proposed to be channelised by constructing embankments 775 Mtrs. apart on either side for a design discharge of 5300 cumecs.

4.0 : **The Project Proposals.**

The project envisages the following main works :

* Construction of embankments in a length of 16.67 km on both the banks of river.
* Construction of permeable and non-permeable spurs and side drains.

5.0 : **Programme of Execution**

(Completion Period : 7 Years)

No. of Year	Funds to be utilised	Works to be done RD	
		From	To
1st Year	7 crores	19160	17900
2nd Year	12 crores	17900	15750
3rd Year	15 crores	15750	13100
4th Year	17 crores	13100	10100
5th Year	17 crores	10100	7000
6th Year	15 crores	7000	4300
7th Year	19.72 crores	4300	2500

6.0 : **Design Criteria.**

Minimum spacing of embankments is to be kept as 2 to 3 times the Lacey's stable width. The recommended spacing in the reach between Jhalera bridge to Santokhgarh bridge shall be 775 Mtrs. for 5300 cumecs design discharge.

A flood discharge of 5300 cumecs has been finalised by the CWC vide their letter No. HP/98/Hydrology/HYD(N)/146 Dated 19-5-99. Swan river has bed material of uniform distribution and embankment height required is quite low therefore, homogeneous type of embankments have been proposed. Although foundations are not actually designed, however, certain provisions for treatment are made in the design for stable support and resistance to percolation. A layer of 0.25 Mtrs. of base of embankment is proposed to be stripped for providing suitable foundations.

While designing embankments, the following essential requirements for design and safety have been taken into account.

* Crest of embankment is kept above HFL and free board of 1 Mtrs is provided.
* Sufficient cross section of embankment is provided so that hydraulic gradient line lies with in body of embankment.
* The upstream slope protection is resorted through slope pitching of stones in crates and downstream slope protection is proposed to be accomplished by a layer of shingle available from beds of tributries.
* To safe guard embankments from erosion launching apron is provided on the river channel side. Spurs are also proposed along with launching aprons.

7.0 : **Economic Evaluation.**

7.1 : **Benefits.**

Saving in the flood damages after the construction of project are indirect flood benefits. The 1st phase of the project which is envisaged between Santokhgarh bridge to Jhalera bridge, the annual damages due to flood in Swan river to lands, crops, buildings etc. are to the tune of Rs 1029 lakhs. These will be totally avoided. An area of 1000 ha. already eroded shall be reclaimed and further spreading of erosion could be checked. Further, an area of 1260 ha. which is not under cultivation due to fear of floods shall be profitably put to use, besides other indirect benefits.

7.2 : **B.C.Ratio.**

The annual benefits from the project are estimated to be Rs 2402.68 lakhs on the basis of damages to property and life averaged during last 10 years. Whereas, the annual cost of project at 17% is Rs 1691.12 lakhs.

The B.C.Ratio is thus 1.42:1

(B.C.Ratio calculation is given at Annex-I.)

8.0 : **Inter-State Aspects.**

The project area is located wholly within the State and thus does not required any Inter-State aspects. However the State Govt of Himachal Pradesh is advised not to take up any Channelisation works in the 2.5 kms reach down stream of Santokhgarh bridge.

9.0 : **Environmental Aspects.**

There will not be any adverse impact on environment after execution of the project. On the contrary, Environment and Ecology will improve because of reduction in erosion and inundation of vast tracts of land. However a copy of the detailed EIA report had been sent to Ministry of Environment & Forest. Concurrence of the project is yet to be received.

10.0 : **Examination of the Scheme.**

The scheme was examined in Cost Engineering (HWF) Dte., Embankment (N&W) Dte., Hydrology (N) Dte., Basin Planning Dte., I&P Dte., Flood Management - I Dte., CMC Dte. of Central Water Commission & Ministry of Water Resources, Central Ground Water Board Departments. All the above Dte./Department accorded clearance/acceptance of the project except Ministry of Environment & Forest. The technical examination of project in Central Water Commission is based on the data furnished in the project report. It is presumed that the data presented are accurate. The latest cost of the scheme is 102.72 crores at 1999 price level.

11.0 : **Approval of State Technical Advisory Committee.**

The 20th meeting of State TAC held on 17-9-97 at Shimla discussed the proposal in detail & approved the scheme for Phase-I.

12.0 : **Recommendation.**

Looking at the repeated occurrence of floods in Una district & damages to the infrastructure in affected areas, the implementation of the proposed scheme is considered necessary.

Implementation of the proposed scheme will also save the considerable loss of life and property during floods. In view of position above, the scheme is placed for consideration and acceptance subjected to clearance of Ministry of Environment & Forest.

Annex-I

Swan River Flood Management & Integrated Land Development Project in District Una, Himachal Pradesh

Benefit Cost Analysis of the Integrated Project

S.No.	Project Component	Amount (in lacs)
A.	**COST**	
(i)	Civil Works	9164.04
(ii)	Fishery Development (500 ha. @ 1.35 lacs/ha.)	675.00
(iii)	Horticulture Development (300 ha. @ 0.93214 lack/ha.)	279.64
(iv)	Forestry Development (in 600 ha. of land)	153.29
	Total Project Cost	**10271.97**
B.	**Annual Maintenance & Operation Cost**	
(i)	10% interest on Rs 10,271.97	1027.20
(ii)	2% depreciation on Rs 9484.54 [Capital Cost - (B-land + Y-Losses of Stock + II Establishment)]	189.69
(iii)	5% maintenance on Rs 9484.54	474.23
	Annual Cost (i + ii + iii)	**1691.12**
C.	**BENEFITS**	
(i)	Flood damages per year.	1028.99
(ii)	Flood damages after project per year.	Nil
(iii)	Flood benefits per year (i - ii)	1028.99
(iv)	Benefits from fishery development per year.	225.00
(v)	Benefits from horticulture development per year.	110.79
(vi)	Benefits from forestry development per year.	876.67
(vii)	Benefits from agriculture development per year.	161.23
	Annual Benefits	**2402.68**
	Benefits - Cost - Ratio =	**1.42 : 1**

Annex II

Swan River Flood Management and Integrated Land Development Project, Phase-I - Himachal Pradesh

GENERAL ABSTRACT OF COST
(on price level May, 1999)

	Direct Charges	Amount (Rs in lakhs)
	I-Works	
A-	Preliminary	11.66
B-	Land	24.13
C-	Works	7616.87
K-	Buildings	131.38
O-	Miscellaneous	16.80
P-	Maintenance	80.82
Q-	Special T & P	44.05
R-	Communication	333.75
X-	Environment & Ecology	1.00
Y-	Losses on stock	20.21
	Total of I - Works	**8280.67**
II.	**Establishment**	**743.09**
III.	**Ordinary T & P**	**82.81**
IV.	**Suspence**	**–**
V.	**Receipt & Recoveries**	**9106.57**
		(-) 25.34
	Total of Direct Charges	**9081.23**
	Indirect Charges	
(i)	Audit & Account Charges	82.81
(ii)	Capitalised value of abatement of land revenue	--
	Total of Indirect Charges	**82.81**
	Grand Total of Direct & Indirect Charges	**9164.04**
(i)	Civil Works	= 9,164.04
(ii)	Fishery Development (500 Ha. @ 1.35 lacs/ha.)	675.00
(iii)	Horticulture Dev. (30 ha @ 0.93214 lacs/ha.)	279.64
(iv)	Forestry Development (in 600 ha. of land)	153.29
		10,271.97

Total Project Cost = Rs 102.72 crores

Annex.-III

Detail of Damages during past 10-12 years due to floods in Swan River between Santokhgarh and Jhalera Bridges (Phase-I)

S.No.	Detail	Nos.	Govt.	Pvt.	Govt./Pvt.	Others	Total
1.	Villages effected	29	--	--	--	--	29
2.	Land damaged (in acres)						
i)	Culturable	--	246	10644	--	--	10890
ii)	Water-logged	--	63	121	--	--	184
iii)	Barren	--	2039	9960	--	--	11999
iv)	Pastures	--	1584	2814	--	--	4398
v)	Forests	--	34	83	--	--	117
vi)	Erosion	--	331	475	--	--	806
	Total	--	4297	24097	--	--	28394
3.	Monetary loss of land effected by floods in lacs	--	644	3325	--	--	3969
4.	Crops damaged	--	--	--	2540.94	--	2540.94
5.	Building loss						
i)	Katcha	18230	--	--	--	--	18230
	Damage in lacs Rs.	--	--	3550	--	--	3550
ii)	Pucca	589	--	--	--	--	589
	Damage in lacs Rs.	--	--	8.00	--	--	8.00
iii)	Cow-sheds	8605	--	--	--	--	8605
	Damage in lacs Rs.	--	--	808	--	--	808
iv)	Others	2186	--	--	--	--	2186
	Damage in lacs Rs	222.53	--	--	--	--	222.53
6.	Live stock loss	174	--	--	--	--	174
	Damage in lacs Rs	--	--	1.50	--	--	1.50
7.	Human loss	45	--	--	--	--	45
	Relief provided in lacs Rs.	--	--	--	--	3.37	3.37
8.	Damage to bridges & roads etc. (in lacs)	--	116.70	--	--	76.97	193.67
9.	Damage to existing E.P.W etc (in lacs)	--	--	21.86	--	--	21.86

Total loss in the reach of the Swan river for which this project is envisaged for the last 10-12 years 11318.87 lacs

Hence average loss per year i.e. 11318.87/11 1028.99 lacs/year

Swan River Flood Management and Integrated Land Development Project, Phase-I - Himachal Pradesh

FISHERY DEVELOPMENT

A.	**Cost**	
(a)	Capital Expenditure	
(i)	Construction of one ha. pond with shallow turbewell	Rs 1.00 lac
(ii)	Construction of fish seed farm 5 ha. of land, nursery, administrative block, residential complex, breeding @ Rs 160 lacs for 800 ha of land.	Rs 0.20 lac.
(iii)	Maintenace cost and staff salary etc. @ Rs 115 lacs for 800 ha of land for one ha. of land 1.15,00.000/800.	Rs 0.15 lac
(b)	Recurring Expenditure	
	Pond construction, lime, raw cattle dung, fingerlings, urea, feed, super-phosphate and netting charges etc.	Rs 0.16 lac.
B.	**Benefits.**	
(i)	Sale of 3000 kg of fish @ Rs 20/- per kg.	Rs 0.60 lac.
(ii)	From sale of fingerlings of IMC Exotic carps (40,00,000 x 15)/(1000 x 800) = 750/-	Rs 0.01 lac
	Total benefits per ha.	Rs 0.61 lac
	Net annual benefits	= 0.61 lac - 0.16 lac = 0.45 lac per ha.
	Net annual benefits from 500 ha fisheries	= Rs 500 x 0.45 lac. = Rs 225.0 lacs.

Annex V

Swan River Flood Management and Integrated Land Development Project, Phase-I - Himachal Pradesh

HORTICULTURE DEVELOPMENT

A.	**Cost**	
(a)	Capital Expenditure	
(i)	Gauva Cultivation in 0.33 hectaure @ Rs 22.141/- per hectare	Rs 7.380
(ii)	Pear cultivation in 0.33 hectaure @ Rs 22.141/- per hectare	Rs 7.380
(iii)	Grapes cultivation in 0.33 hectare @ Rs 1,94,938/- per hectare	Rs 64,979
(iv)	Cost of demonstration plot for Gauva & Pear @ Rs 66,420/- for 15 plots in 200 hect. of land i.e. 66.420/200	Rs 332
(v)	Cost of demonstration plots for grapes @ Rs 5.84,820/- for 15 plots covering 100 hect i.e. 5,84,820/100	Rs 5,848
(b)	Recurring Expenditure for Nurseries	
(i)	Cost of Nursery @ Rs 2,52,524 for 300 hectares i.e. 2.52,524/300	Rs 842
(ii)	Expenditure on wages of staff salaries @ Rs 19.03,400/300	Rs 6.345
(iii)	Expenditure for imparting training to farmers @ Rs 32.500 for 300 hectares i.e. 32.500/300 per hectare	Rs 108
	Total expenditure per hectares	Rs 93.214

B. **Recurring Expenses Per Year**

Gauva 0.33 @ Rs 5,000 per ha.		Rs 1,667
Pear 0.33 @ Rs 5,200 per ha.		Rs 1,733
Grapes 0.33 ha @ Rs 3,900 per ha.		Rs 1,300
	Total	Rs 4,700

C. **Benefits**

Gauva 0.33 @ Rs 20,400 per ha.	Rs 6,800
Pear 0.33 @ Rs 39,200 per ha	Rs 13,100
Grapes 0.33 @ Rs 65,190 per ha	Rs 21,730
Total Benefits per ha.	Rs 41,630

Net Annual Benefits = Annual Benefits - Annual Cost
Rs 41,630 - Rs 4,700
Rs 36,930 per ha.

Total Benefits from 300 ha. per year = Rs 36,930 x 300
Rs 1,10,79,000

Swan River Flood Management and Integrated Land Development Project, Phase-I - Himachal Pradesh

FORESTRY WORKS

A.	**Cost**	
(i)	Afforestation	
(a)	Plantation on protected (reclaimed/ inundated), shamlat ans surplus ceiling land i.e. in 650 hectaures @ Rs 16,500/- per ha.	Rs 1,07,25,000
(b)	Engineering works on shamlat/surplus lands of 650 ha @ Rs 5,500 per ha.	Rs 35,75,000
(ii)	Raising of Nursery	
	Raising of nursery for the distribution of plants to farmers for promoting social forestry. Three Nos. nurseries are proposed in the 16 kms stretch of the Swan River each nursery to have 20,000 to 25,000 plants with cost of each plant @ Rs 3/- only Total Cost = 3 x 25,000 x 3	Rs 2,25,000
(iii)	Cost of Fuel Saving Devices	
(a)	Dholadhar chullahs, 1455 @ Rs 250/- each and training cost @ Rs 3/- per chullahs 1455 x 250 + 1455 x 30	Rs 4.07,400
(b)	Cookers 1455 Nos. @ Rs 190/- each (excluding Rs 90/- per cooker being the subsidy) 1455 x 190	Rs 2,76,450
(c)	Fuel efficient crematoria. 3 nos. @ Rs 40,000 each 3 x 40,000	Rs 1,20,000
	Grand Total of item (i) to (iii)	Rs 1,53,28,850 Say Rs 15329 lacs.

B. **Benefits.**

(i)	Afforestation in reclaimed and inundated area 650 hect @ Rs 1,33,333/- per ha.	Rs 8,66,66,650
(ii)	Social Forestry 200 hect @ Rs 5,000/- per ha.	Rs 10,00,000
	Total Benefits	Rs 8,76,66,650 i.e. Rs 876.67 lacs/year

Annex VII

S.No.	Crop	Income Before Irrigation			Income After Irrigation			Average Income 50% Irrigated 50% Un-Irrigated (Rs./ha)	Crop Area (ha)	Total Income (lacs)	Remarks
		Exp.	Income (Rs./ha)	Net Income	Exp.	Income (Rs./ha)	Net Income				
1	Maize	7,250	11,750	4,500	8,150	16,400	8,250	6,375	500	31.875	Kharif
2	Paddy				9,600	23,600	14,200	14,200	100	14.200	Kharif
3	Summer Vegetables				11,200	30,000	18,800	18,800	60	11.280	Kharif
4	Fodder				5,050	11,250	6,200	6,200	50	3.100	Kharif
5	Sunflower				6,650	18,000	11,350	11,350	50	5.675	Kharif
6	Sugarcane	11,200	18,000	6,200	11,800	24,000	12,200	9,200	100		Kharif
7	Wheat	6,750	10,750	4,000	7,900	15,900	8,000	6,000	600	36.000	Rabi
8	Potato				23,400	70,000	46,600	46,600	100	46.600	Rabi
9	Fodder				5,050	11,250	6,200	6,200	50	3.100	Rabi
10	Winter Vegetables				11,200	30,000	18,800	18,800	50	9.400	Rabi
								Grand Total Income in lacs/year		***161.230***	

Proforma "B"

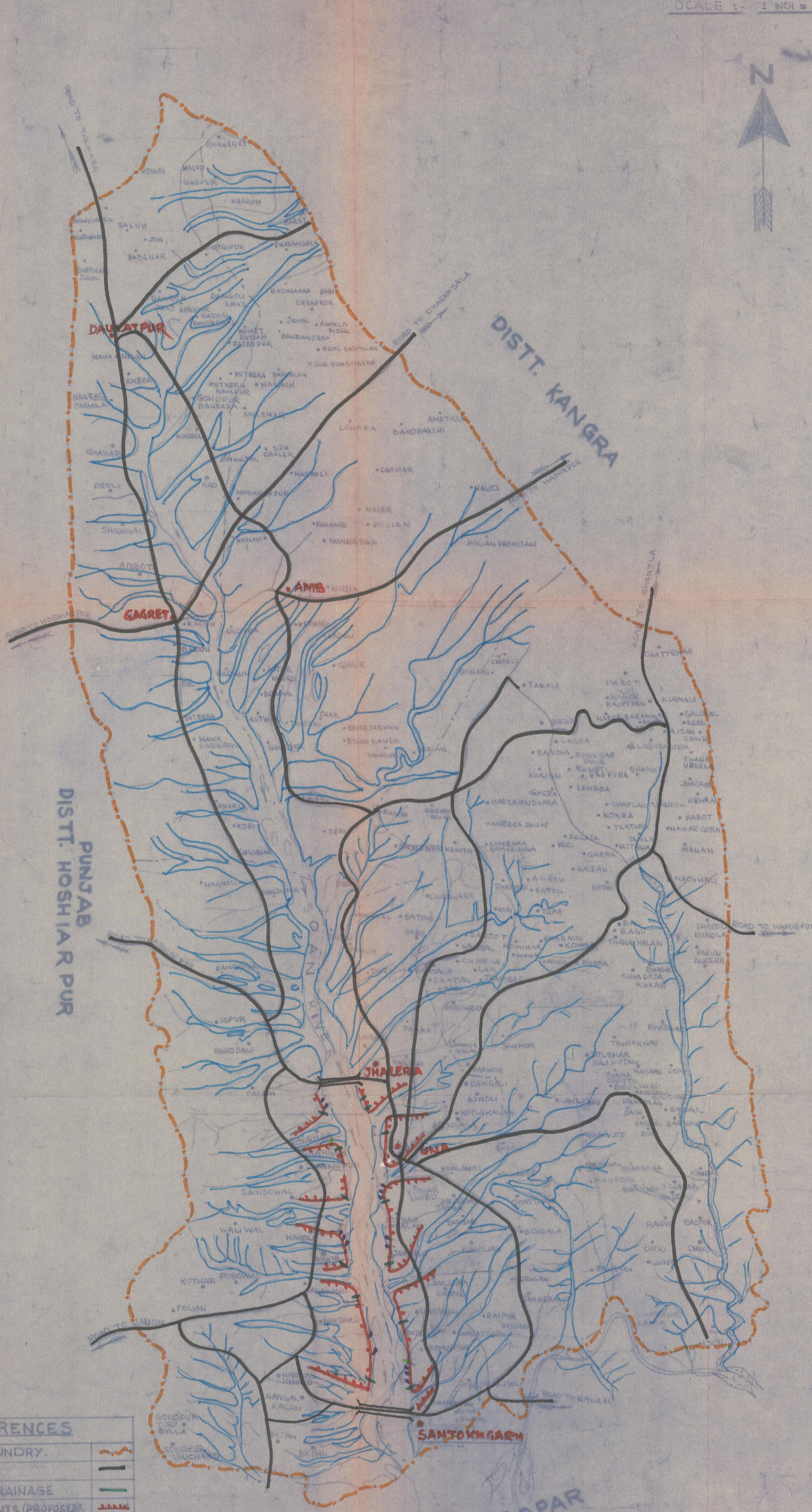
Swan River Flood Management & Integrated Land Development Project in District Una, Himachal Pradesh - Phase-I

1.	Name of scheme (attached location map and index map)	:	Swan River Flood Management & Integrated Land Development Project in District Una, Himachal Pradesh - Phase-I. (Location/Index Map enclosed at Annex-II)
2.	Abstract of cost including foreign exchange components, if any.	:	Abstract of cost enclosed at Annex-I. No foreign exchange component is involved.
3.	Skeleton Report	:	As discussed from page 1 to 8
4.	Area and population, which will get protected from project.	:	Protected area is 2260 ha. of agricultural land and protected population is 48,000 souls.
5.	* Betterment levy or flood cess if any, proposed for the area to be protected from floods or water logging.		Not applicable.
	* Anticipated revenue	:	Nil
6.	Benefit Cost Ratio	:	B.C.Ration is 1.42:1 (Details are at Annex-II)
7.	The extent to which people participation is envisaged for the execution of the scheme in what from.	:	Nil
8.	Whether inter-state/inter-national aspect of the scheme, if any, has been examined by the State Technical Advisory Committee and where necessary clearance of the CWC/Ganga Flood Commission & Ministry of Water Resources has been obtained.	:	No inter-state aspects are involved. Scheme has been cleared by the State TAC during their 20th meeting held on 17-9-97. Scheme has been examined in Central Water Commission and Ministry of Water Resources.
9.	Status of requisite administrative statutory clearance.		--do--

Annexure VIII

MAP OF UNA DISTT.

SCALE :- 1 INCH = 2 MILES



REFERENCES	
1. DISTT. BOUNDRY.	
2. ROADS	
3. SLUICE DRAINAGE	
4. EMBANKMENTS (PROPOSED)	
5. SPURS	
6. SOAN RIVER & TRIBUTORIES	