

Effects of Floods & Remedial Measures Suggested

By

*MIAN ALIM-UD-DIN

It is a subject which has in its orbit about half the Province of West Pakistan the Northern and Western boundaries of which consist of high mountains, long and unending ranges of foot hills with their steep sub-mountainous belts of land. The sub-mountainous land is ravined by streams, big and small, cutting up and inundating most of the area in monsoon season 15th July to end of September, sometimes early October, depending up-on the intensity and frequency of rainfall in the catchment areas. A good number of Streams out of them flow into culturable irrigated lands of the country side, inundate them badly and then fan out into the rivers with a much reduced outfall discharge. The problem exists in almost every part of the land through which the run off passes, differing in magnitude and duration only. It is more pronounced at places where the population intensity is higher and the utility services are tampered with. Such places consist of important cities and towns, lands and villages of important people and lines of communication both railways and road.

It is a problem of human affliction, colossal losses and serious dislocation of the day to day community life. No democratic county can afford to ignore such a calamity which is now visiting the country more often than it used to do a decade or so back. The areas affected, however, are very vast and varied with regard to rainfall, its duration, topography, population and last but not the least politics, but some of them call for the same priority of solution irrespective of the size and the urgency of the problem. Flood control problem is, therefore, essentially a matter of priorities by regions two, three or four as the case may be, for purposes of implementation of the flood control devices but integrated for purposes of conception of the plan.

A well knit, integrated plan to be called Master Plan, spread over a number of years, say 20 to start with, depending upon the availability of finances, skill, and man power is the necessity.

Before such a plan is attempted it may perhaps be profitable to give some idea of the size of the problem that is to be tackled with and the part of the country where the flood havoc is more serious and also frequent.

Sources of flooding and extent of areas damaged.

There are three sources of flooding .—

1. Spill from the Indus and its tributary Rivers, Jhelum, Chenab, Ravi, and Sutlej.

* Superintending Engineer, Lower Chenab West Circle, Lyallpur

2. Spill from the seasonal Nalas and natural drains.
3. Overflowing of the artificial drains and spill therefrom through cuts, breaches and over-topping of the banks.

Table given below will give an idea of the area flooded from the various sources. The figures pertain to 1950 flood for the former Punjab area.

Table I. Area flooded by Rivers and Nalas in Sept. 50.

S. No.	Names of Rivers and Nalas.	Area flooded in acres (Gross area)		
		Irrigated.	Unirrigated.	Total.
Rivers.				
1.	Sutlej.	64,000	—	64,000
2.	Ravi.	14,37,920	—	14,37,920
3.	Chenab.	16,66,560	1,06,880	17,73,440
	Total.	31,68,480	1,06,880	32,75,360
Nalas.				
1.	Basanter.	1,06,880	—	1,06,880
2.	Deg.	8,10,880	2,86,720	10,97,600
3.	Bhimber.	Not observed.		
4.	Halsa.	Not observed.		
5.	Rohi.	1,40,960	—	1,40,960
6.	Hudhiara.	51,840	—	51,840
	Total.	11,73,280	2,86,720	13,97,280
	Add due to rains & Spilling of drains.	1,14,560	—	1,14,560
	Grand Total.	44,56,320	3,93,600	47,87,200

Frequency of Floods.

Another Table below, will show the frequency of damaging floods that visited the former Punjab area through its rivers during the period of 30 years 1920-1950. Limit of damaging flood was worked out by the author with respect to the inundation of areas :—

Table II.

	Indus at Attock.	Jhelum (above Mangla).	Chenab (above Marala).	Ravi (above Madhopur).	Sutlej Ferozepur above.
High flood limit as per Appendix to Chapter 23 of Manual of Irrigation Practice.	6,00,000	2,00,000	2,00,000	1,00,000	2,25,000
Limiting discharge above which the flood starts damage.	6,00,000 (Gauge. 46'00)	3,00,000	3,00,000	1,25,000	3,60,000
Years of damaging floods with discharges during the period 1922-51.	Date: Disch.	Date. Disch.	Date. Disch.	Date. Disch.	Date. Disch.
	24-6-22 610500	1-9-28 601000	1-9-28 686000	30-8-26 145000	28-9-47 425000
	30-7-24 810000	29-8-29 760000	28-8-29 660000	1-9-28 196000	20-9-50 400000
	18-8-29 800000	6-7-31 355000	31-7-32 332326	11-7-30 155000	
	28-8-29 1015000	13-8-48 447179	9-7-33 366000	18-7-32 156795	
	15-7-30 663000		23-7-48 432000	30-7-53 137200	
	13-7-32 684000		4-9-50 325491	22-8-36 192800	
	12-7-42 684000		20-9-50 540761	6-7-42 138000	
				26-9-47 200000	
				3-9-50 215000	
				19-9-50 310000	
	Total No. 7.	Total No. 4.	Total No. 7.	Total No. 10.	Total No. 2.

Data for the period 1951-57 is not included in the above statement. The incidence of floods has, however, been higher during the last 5 years with the ever maximum flood occurring in Ravi in 1955 and Chenab 1957.

Years of Damaging Floods in Punjab during the thirty years 1922-51.

Re-arranging the Table No. II, as below, it will be seen that out of 14 years during the 30 years under examination, there has been a flood of the damaging quality in one or the other of the Rivers of the former Punjab :—

Table III.

Year.	River in flood.	Date.	Discharge.
1922	Indus.	24-6-22	6,10,500
1924	Indus.	30-7-24	8,10,000
1926	Ravi.	30-8-26	1,45,000
1928	Jhelum.	1-9-28	6,01,000
	Chenab.	1-9-28	6,86,000
	Ravi.	1-9-28	1,96,000
1929	Indus.	18-8-29	8,00,000
	Indus.	28-8-29	10,15,000
1930	Jhelum.	29-8-29	7,60,000
	Chenab.	28-8-29	6,60,000
	Indus.	15-7-30	6,63,000
	Ravi.	11-7-30	1,55,000
	Jhelum.	6-7-31	3,55,000
1932	Indus.	13-7-32	6,84,000
	Chenab.	31-7-32	3,32,326
	Ravi.	18-7-32	1,56,795
1933	Chenab.	9-7-33	3,66,000
	Ravi.	30-7-33	1,37,200
1936	Ravi.	22-8-36	1,92,800
1942	Indus.	12-7-42	6,84,000
	Ravi.	6-7-42	1,38,000
1947	Ravi	26-9-47	2,00,000
	Sutlej.	28-9-47	4,25,000
1948	Jhelum.	13-8-48	4,47,179
	Chenab.	23-7-48	4,32,000
1950	Chenab.	4-9-50	3,25,491
	Chenab.	20-9-50	5,40,761
	Ravi.	3-9-50	2,00,000
	Ravi.	19-9-50	3,10,000
	Sutlej.	20-9-50	4,00,000

Mostly from glacier outburst.

In four years viz, 1928, 1929, 1932 and 1950, the flood was in more than 3 Rivers. Out of these. 4. in 3 cases the rivers were in flood

concurrently indicating the the rainfall was wide-spread enveloping 3 adjoining catchments. There were 14 damaging floods in all in the space of 30 years-average 1 per 2 years.

Damage caused by floods.

In the year 1948 Jehlum and Chenab were in high flood and the devastation was great and wide-spread in the former Punjab area. See statement of losses in Appendix I, and the area flooded in Appendix II. The direct damage was of the order of 80 millions of rupees. The damage caused by the 1950 floods was much more due to Ravi, Chenab and Sutlej, all the three rivers being in flood. In this year there were two floods one following the other with an interval of about 15 days. The devastation was, therefore, much more severe than it was in 1948.

The areas inundated are given in Table I above and are shown on a Plan, Appendix III. The total direct national loss was of the order of Rs. 230 millions, Appendix IV. The figures do not take into consideration the indirect losses which were also very heavy. Take for instance only one item Cotton which was damaged. The area that suffered was 1,00,000 acres which means, 50,000 exportable bales. The Government charged about Rs. 300/- per bale as duty in 1951. The loss due to this item alone works out to about 15 millions of rupees. Another indirect loss was suspension of traffic on the railways. The exact money could not be assessed, yet the N.W.R. was of the opinion that an approximate figure of 7.5 millions of rupees could be taken in that connection, the details of which, are given in Appendix V. These are the losses which can be assessed in terms of exact money. The more serious and alarming damage is that which is caused to the lands in the form of abrupt jump in the rise of the sub-soil water table, which is already a serious problem in some of the canal irrigated areas, as it eventually brings about the problem of 'Thur'. The jump caused by the flood stays on, to be added further by the subsequent annual risings due to permanent causes.

After 1950 the two Rivers Ravi and Chenab were again visited by floods in the years 1954, 1955 and 1957. The flood of 1955 in Ravi was unheard of and was the highest, about 6 lac cusecs at Madhopur. The flood in Chenab in 1957 was higher than that of 1950, forming yet another record of its height. The total direct losses by the floods in 1948 and 1950 aggregate to 310 millions of rupees. Adding to this figure the losses caused by the floods of 1954, 1955 which may be assumed at the rate of $310/2=155$ millions of rupees per flood, the total loss for the period 1948 to 1955 works out to 620 millions of rupees. Adding further the losses (assuming the same figure as that of 1950) that were caused in 1957 when both Chenab and Ravi were in abnormal floods higher than those of 1950, the total aggregate direct loss suffered by the nation during the period 1948 to 1957 works out to Rs. $620+230=850$ millions. The figure will easily go to 1,000 millions, if the indirect losses are also taken into consideration. This works out to 100 millions a year on the average in the former Punjab area alone.

enefits from floods.

As against the losses that are inflicted by the floods, the impression goes that there is considerable benefit also, which comes in the form of increased cultivation and increased yield from the sown crops during the following Rabi. This impression is falsified from the figures given below which pertain to 1950 floods in the former Panjab area only.

See Table I wherefrom it will be seen that the flooded area consisted of irrigated area mostly. The increase in the irrigated area on the various canals affected, however, was of the following order :—

Table IV.

No.	CANAL	AREA IRRIGATED				Remarks	
		Rabi 1950-51	Rabi 1949-50	Average of last 5 cor- responding corps	Difference of cols. 3 & 4		Difference of columns 3 & 5
	2	3	4	5	6	7	8
		Acres	Acres	Acres	Acres	Acres	
1.	Central Bari Doab	327,673	220,250	245,050	+107,423	+ 82,623	
2.	Lower Bari Doab	881,548	805,980	789,477	+ 75,568	+ 92,071	
3.	Uppcr Chenab	248,219	332,128	366,208	- 83,909	-117,989	
4.	Lower Chenab	1,605,317	1,605,042	1,605,554	+ 275	- 273	
5.	Pakpattan	533,578	448,104	451,135	+ 85,474	+ 82,443	
6.	Mailsi	221,792	211,055	213,438	+ 10,737	+ 8,354	
7.	Haveli	530,740	543,201	518,918	- 12,461	+11,822	
	Total ...	4,348,867	4,165,760	4,189,780	+ 223,107	+1,59,051	

Appendix III will show that the flooded area was concentrated in the irrigation boundaries of Upper Chenab Canal and the Lower Chenab Canal, in these two cases, the net figures are rather on the minus side. There is some increase in the case of other canals but that may partly be due to the widespread rains in those areas, which are not directly affected by floods. Assuming 50 % for the flooded area and the remaining 50 % due to wide-spread rains only, the benefit in the irrigated area due to floods was of the order of 79543 or 80,000 acres. Assuming a more liberal figure, we may take it as 1,00,000 acres. This area at 10 maunds of grain per acre and at Rs. 10/- per maund would give Rs. 100 lacs. Another 100 lacs of rupees which seem to be on the high side may be assumed for the unirrigated area, which according to Table II was only 4 lacs as against 44.5 lacs of the irrigated area. That makes a total direct benefit of 20 millions of rupees, which does not compare favourably with the direct losses of 230 millions that were suffered.

Steps so far taken to minimise the misery.

A Committee was formed with the Minister of Revenue of former Punjab as Chairman to suggest ways and means to meet the flood situation arising out of the floods of 1948. The Committee submitted a report to the Government in 1949. A number of schemes were proposed, long term and short term, to protect important areas and towns. The cost of the schemes was Rs. 1,11,59,800/- for immediate expenditure and Rs. 1,10,33,000 for deferred works. A few of the works that were more urgent were taken in hand.

After the floods of 1950 which were more severe a commission was set up by the Central Government named 'Punjab Flood Commission of 1951', to go into the causes of recurring floods in the former Punjab areas, suggest ways and means to control them and minimise the occasional devastations that were caused. This Commission submitted a report marked 'secret' to the Government in 1951. The report was printed and is available in the Libraries of the various offices of former Punjab. The cost of the schemes proposed therein, ran into 15 crores of rupees. Some of the proposals made and noted below were implemented :—

1. Enactment of wide statutory provisions to set up an office of the Relief Commissioner for coordinating the activities of all departments to combat the calamity;
2. Construction of some of the flood protection works which could be taken up within the provincial resources;
3. Setting up of the flood warning system in collaboration with the Metrological Department of the Pakistan Government and,
4. Setting up of Central and District Organizations to provide spontaneous relief during the floods such as evacuation of the marooned population and their feeding with properly organised basis therefore at the back, and then after the floods rehabilitating them without prolonging the misery.

There is a standing Indus River Commission in the former Sind Area, which reviews the flood Protection schemes from time to time and vets the engineering proposals.

The unfortunate part of the whole affair, however, has been that feverish activity is witnessed on the part of all departments after each heavy flood, some organisations are set up to plan and report, some stray proposals are also implemented but with the lapse of time, the operation slow down and eventually the whole thing is forgotten. The result is that the situation remains where it was 10 years back with stray relief here and there, but increased tempo of devastation at other places. There appears to be no doubt that there has been some perceptible improvement in the relief measures and the warning system, with the result that human misery is mitigated.

Proposal for future.

This is an important part of this Paper. It should by now be clear that stray proposals and their part implementation will not do. The process has already been tried without appreciable success. A coordinated, well knit Plan, spread over a number of years, say 20, prepared and supervised by a permanent organisation is the necessity; the Plan to be reviewed every year and improved upon in details. Such a Plan may be called MASTER PLAN to be merged in the national 5 year Plans prepared from time to time.

Master Plan.

It is not within the scope of this paper to lay down the whole Plan nor is it the job of one man to conceive the whole of it with any degree of precision. The author has, however, some broad ideas of his own which may be of some use. They are laid down as follows, in the shape of recommendations :—

1. For the purpose of preparing schemes under the MASTER PLAN, the whole of West Pakistan area which is subject to flooding should be divided into two zones, Northern and Southern; the Northern comprising former Punjab, former Frontier Province and former Bahawalpur, the rest, viz, former Baluchistan, former Sind and Khairpur to form Southern. The two zones should have their own priorities to satisfy the public opinions all over.

2. For the Northern Zone Table No. II will show that the sore spot with respect to floods is the area inundated by Sutlej, Ravi, Chenab and Nalas that intervene between these Rivers taking off from the Northern Hills. This area should, therefore, get a very high priority.

3. The basic recommendation of the Punjab Flood Commission 1951 was as follows :—

No really effective measures can be taken to control floods in the rivers Jhelum, Chenab, Ravi and their tributary nalas, except by con-

structing flood detention reservoirs in their hilly catchments. which, for the most part, lie in Indian territory, or in India-held Kashmir.

The Commission is strongly of the opinion that, so long as the steps mentioned above remain impossible to undertake, the Province of the Punjab will be exposed to the fury of future floods, and the resulting calamity may not only jeopardies Punjab economy, but have a highly deleterious effect on Pakistan's economy as a whole." It still holds good for the three rivers and the Nalas mentioned in item 2. The obvious course left is detention reservoirs, judiciously conceived levees, diversion channels and other detention devices in the plans.

4. The ideal position which a layman would like to be achieved is that there is no flooding any where in the culturable part of the land, no towns are flooded and no lines of communication are interrupted. It may not be possible to achieve this ideal but the heights of the flood and the duration thereof at more important places can surely be brought down.

5. While framing this Plan psychology of the people should not be lost sight of. Priority should be given to those works and schemes which can produce immediate results and the people actually feel the impact for instance :—

(i) The Lahore protection Bund should be made strong enough not to breach at all events.

(ii) The main lines of communication such as G. T. Road and the railway line between Lahore and Jhelum should be kept intact at all costs by removing the causeways and having adequate bridging at these places. So far, the practice has been to provide bridges or syphons for part of the discharge, in some cases as low as $\frac{1}{4}$ th. This should change now. The highest discharge passed should be catered for and the water way kept intact during floods.

(iii) Much of the flooding of Sheikhpura, Gujranwala and Sialkot Districts is caused by the Deg Nala and its tributaries the main out of which is Hasri Nala. The discharge brought is as high as 1 Lac cusecs all of which spreads over the heavily cultivated land of these Districts This Nala should be trained to outfall into Ravi on the left of M. R. Link near the border. If the whole of its discharge cannot be diverted, a substantial part of it can certainly be done. An artificial detention reservoir can also be made near the Sialkot-Jammu border, where this Nala enters the Pakistan territory. The cost is hardly 1.5 crores. If this is done, the discharge left to cross the M-R Link, Rayya Branch of U. C. C., G. T. Road, the Railway line between Lahore and Gujranwala Lahore-Sheikhpura, Arterial Road, Lahore-Lyallpur. Arterial Road, Lahore-Sheikhpura Railway line and Lahore-Lyallpur Railway line shall be very considerably reduced to make them all weather communications.

(iv) The diversion of Deg Nala into Ravi in the Sialkot District would mean augmentation of peak in the Ravi River itself which may be quite damaging for the bridges and headworks that exist on the River D/S. It may also result in the extension of flooding on the fringe areas of the river. Providing of more water-way across the present works or having separate diversion channels of the type that is being constructed at Sidhnai should be examined to be included in the Plan.

(v) Possibility of a Diversion channel between Ravi and Sutlej for part of the discharge say one lac cusees may be investigated, as study has shown that peaks in Ravi and Sutlej have seldom coincided and with careful regulation the capacity available in Sutlej can be utilised to bring down the peak in Ravi. Advantage should be taken of the available capacity of Sutlej river after the construction of Bhakra Dam.

(vi) There is quite a cry along the two banks of Chenab to stop the recurring inundation. Levees have been put in as a result of 1951 recommendations between Jalalpur and Pindi Bhattian and then between Vagh Drain and Jalalpur on the left bank of the River. Schemes for some more bunds are under consideration. This is being done without assessing the over-all effect on the vital installations of the river such as bridges and Headworks with the result that the Marginal bunds of these works are to be breached for their safety. This is not a very satisfactory method of putting in levees, saving some areas and damaging the others which may be equally important. The valley should be considered as a whole and an integrated Plan made with proper water-ways for the installations, the safety of which remains the first priority at all events.

(vii) Almost all levees so far built along Chenab breached during the 1957 flood, though the size of the flood was only a bit higher than that of 1950 with respect to which they were constructed. It should be investigated by a Committee of Engineers as to why these bunds breached at a number of places and what further is needed to make them effective during the emergency. In my view there is no proper maintenance for these levees. The rats are doing their job for the whole year and when the flood comes, the bund leaks through and then breaches. The sections of the bunds are also not adequate. They should be on the pattern laid down in the Bund Manual of Sind with soaking channel in between to consolidated the slopes of the main bund before the flood season commences. The policy should be either no bund or a bund which has no chances of breaching.

(viii) An important source of flooding in the country side during the recent years has been our artificial drains. Quite a lot of area of Lyallpur, Sheikhpura and Guiranwala Districts was flooded by the spilling over of these drains. The capacity of the drains is obviously not adequate to cope with the situation. It is necessary that the re-conditioning of these drains is also brought under the Plan.

(ix) Rohi Nalla near Kasur between Ravi and Sutlej coming from the Indian territory causes severe devastation when in flood. It is

required to be canalised for a considerable length so save the costly cultivated area and the arterial road between Lahore and the border near Gandasingh-wala.

(x) There are already huge lengths of levees along Indus both in former Punjsh and in former Sind. The whole valley should come in the Plan as 'One Unit,'

Position of the Jhelum River is different. Considerable advantage is likely to accrue after the Mangla Dam is completed. The whole Jhelum Valley should, therefore, be treated as One Unit to plan the flood protection works on this River. There are, however, some bad Nalas coming independently from the Northern Hills which should be included in the Plan.

The above will just give a glimpse to show what gigantic work the flood protection job is going to be in the Province. It is absolutely necessary that a Plan is prepared showing the various schemes and the benefits that are going to accrue from them with probable costs involved. Our Government will then be in a position to enlist the support of our friendly countries to help us in providing the capital and machinery required for the job. That will go a long way in the Development of the Country.

App. I

Statement showing the extent of damage caused by
the West

Name of District	No. of villages damaged	No. of villages destroyed	Loss of human life	No. of cattle lost	No. of houses damaged
1.	2.	3.	4.	5.	6.
Lahore.	44	1	—	—	262
Sialkot.	183	8	—	27	2062
Gujranwala.	140	14	4	48	781
Sheikhupura.	576	13	1	146	15477
Gujrat.	134	6	8	431	—
Shahpur.	475	47	22	227	5200
Jhelum.	544	1	132	1263	15797
Rawalpindi.	—	—	—	—	—
Attock.	—	—	6	—	—
Mianwali.	121	3	—	125	1277
Montgomery.	41	3	—	100	513
Lyallpur.	121	2	1	—	599
Jhang.	350	—	—	—	—
Multan.	211	—	—	—	6122
Muzaffargarh.	469	128	8	461	18711
Dera Ghazi Khan.	51	2	—	49	207
TOTAL	3450	228	150	2877	67008

Cost of the damaged crops.

Cost of destroyed houses. 91592 @ 250/- each.

Cost of damaged houses 67008 @ 100/- each.

Cost of cattle lost. 2877 @ 200 Rs. each.

Total.

Add cost of repairs to irrigation channels
roads etc.

recent abnormal floods in the various Districts of Punjab during 1948.

No. of houses destroyed.	Quantity of Bhusa destroyed in Mds.	Quantity of food grains destroyed.	Approximate cultivated area affected.	Acreage of crops destroyed.	Approximate value of crops destroyed.	Remarks.
7.	8.	9.	10.	11.	12.	13.
131	1097	1121	3075	—	248690	
990	6677	818	52818	6406	312009	
677	8730	2765	30062	3461	454550	
30953	50745	2805	67492	97038	—	
15006	64556	Considerable.	30521	—	—	
15724	251297	13696	496514	242079	24207900	
17725	20643	7036	29639	28728	167540	
—	—	—	—	138125 Md	—	
—	—	—	38	38	3290	
525	68936	3437	8106	8106	70000	
441	3065	—	1712	2446	95965	
295	39565	1040	47920	—	668000	
—	—	Considerable.	—	10000 (Estimated).	—	
4725	57655	46856	26468	26468	2030936	
3456	143438	27809	435352	27895	793709	
944	15078	2368	1720	1720	48549	
91592	731482	109551	1531451	454385	42,380,265	
= 4,23,80,265						
= 2,28,98,000						
= 67,00,800						
= 5,75,400						
= 7,25,54,465						
75,00,000						
= 8,00,54,465 Say. 8 Crores.						

App. IV

Statement showing the extent of
(based on data received

S. No.	Name of the District.	No. of villages damaged.	No. of villages destroyed.	Loss of human life.	Cattle lost.	No. of houses damaged.
1.	2.	3.	4.	5.	6.	7.
1.	Lahore.	361	34	28	432	16,935
2.	Sialkot.	960	401	315	8,549	39,470
3.	Gujranwala.	525	111	71	10,005	18,182
4.	Sheikhupura.	746	256	25	10,102	80,522
5.	Gujrat.	140	20	22	1,706	872
6.	Shahpur.	37	5	1	335	980
7.	Multan.	400	184	—	603	8,279
					Mostly sheep and Goats.	
8.	Montgomery.	277	112	13	943	10,947
9.	Lyallpur.	140	208	26	423	7,156
10.	Jhang.	306	146	71	4,810	47,244
11.	Muzaffargarh.	161	2	—	—	5,704
Total.		4053	1479	572	37,908	2,36,291

Abstract of cost.

1. 37,908 Cattle lost @ Rs. 200/-
2. 2,36,291 Houses damaged @ 100/-
3. 2,60,197 Houses destroyed @ Rs. 250/-
4. 35,25,571 Maunds Bhusa destroyed @ Rs. 1/- per Md.
5. 14,48,565 Maunds Foodgrain destroyed @ Rs. 10/- per maund.
6. Value of crop destroyed.
7. Lump sum loss of valuable property in cities like Lahore, Gujrat and Jhang,

Add to this cost of Repairs to damaged Irrigation channels and Pucca works after floods.

Cost of repairs to damaged roads.....

Cost of repairs to damaged railway lines.

Relief Measures (approximate).....

Total.

damage caused by floods of 1950.
upto 28. 12. 50).

No. of houses destroy- ed.	Bhusa destroyed (in maunds).	Foodgrain destroyed (in maunds).	Approximate cultivated area affected (Acres).	Crops destroyed (Acres).	Approximate value of crops (Rs.).
8.	9.	10.	11.	12.	13.
13,648	53,681	7,708	1,18,585	53,905	79,88,390
33,976	6,17,050	1,93,699	1,49,145	1,05,667	63,54,087
25,083	4,02,845	88,156	74,784	52,809	54,97,940
65,546	50,000	2,00,000	4,15,491	2,03,716	1,81,52,216
9,115	43,581	29,287	37,339	10,674	3,45,220
886	27,956	6,842	16,502	4,372	2,94,742
41,062	6,12,303	2,09,820	2,00,425	1,50,703	1,21,15,015
21,293	5,98,654	1,61,270	43,603	43,603	52,98,353
31,555	6,17,895	2,91,586	2,14,718	1,12,531	2,42,01,780
13,733	4,51,606	2,58,197	2,04,659	83,465	60,00,529
4,300	20,000	2,000	36,261	15,000	3,00,000
260,197	35,25,571	14,48,565	15,12,012	8,36,445	8,65,48,272

75,81,600
2,36,29,100
6,50,49,250
35,25,571
1,44,85,650
8,65,48,272
20,00,000

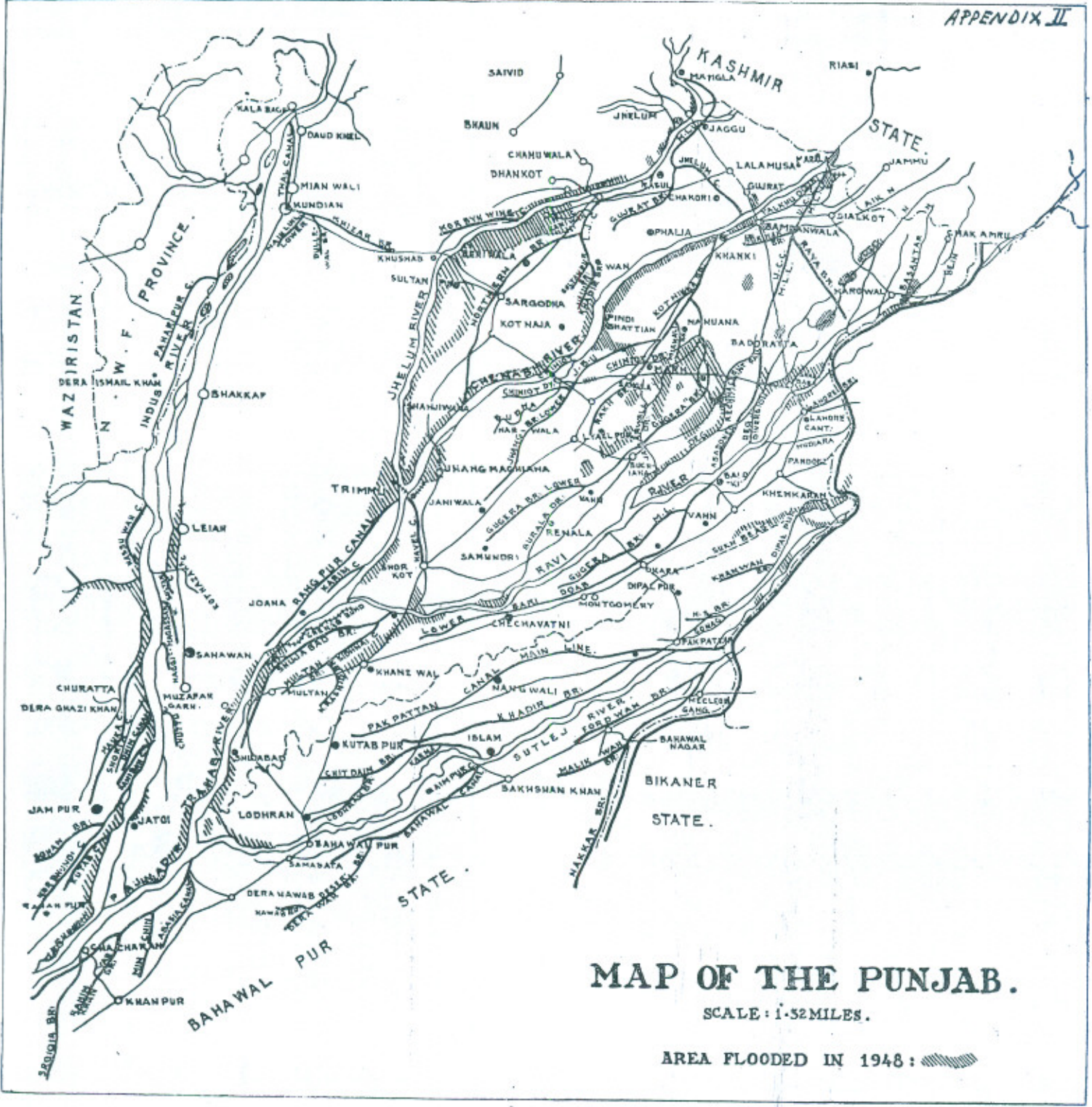
20,28,19,443
1,00,00,000
45,00,000
60,00,000

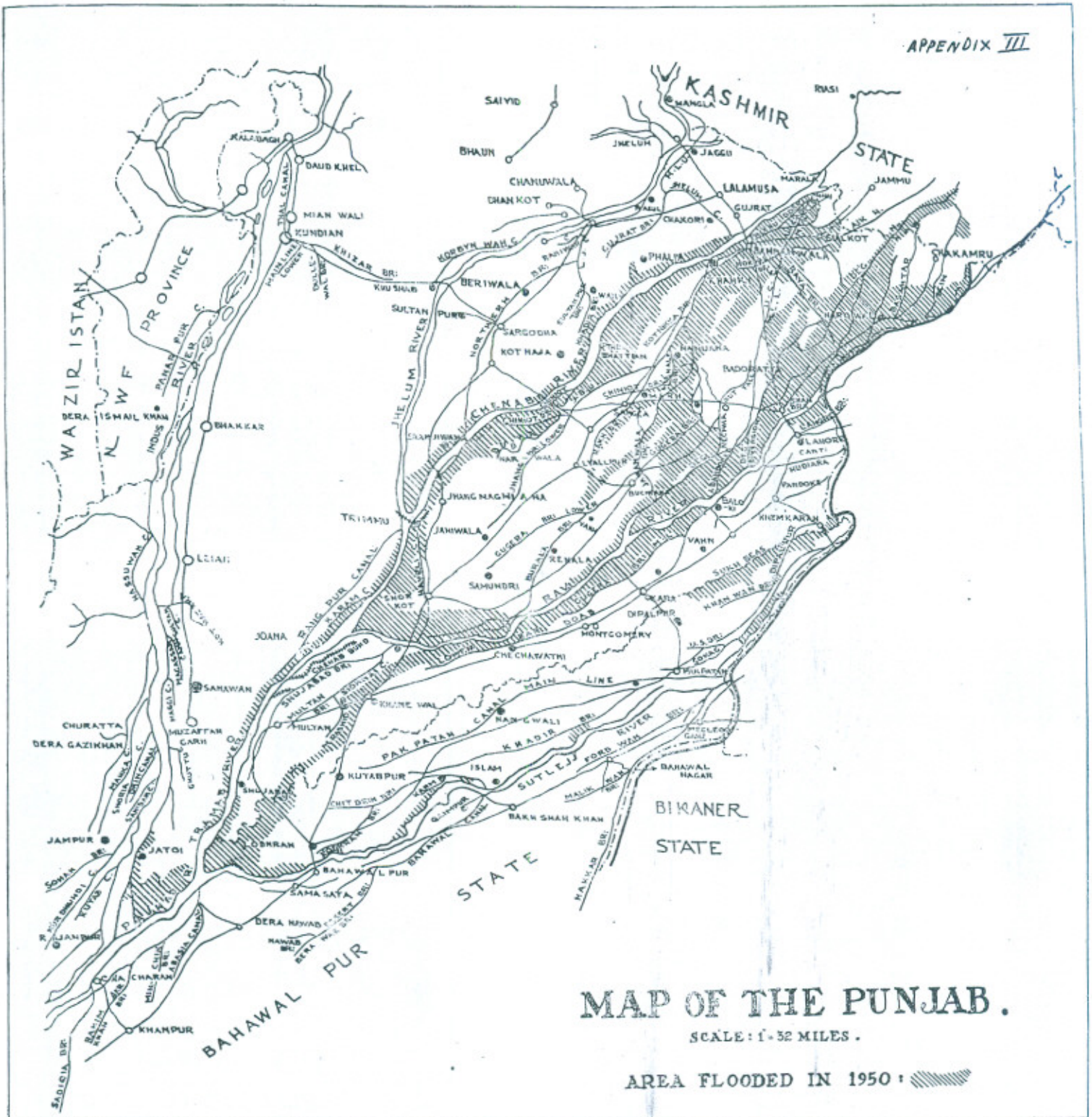
22,33,19,443
50,00,000

22,83,19,443 Say. 23 Crores.

Appendix V.

S. No. Sections.	Loss in Rupees.
Main Line.	
1. Shahdara Bagh-Wazirabad.	6,50,044
2. Wazirabad Lalamusa.	1,36,040
3. Lodhran-Multan.	4,68,741
4. Khanewal-Multan.	18,774
Branch Lines.	
5. Khanewal-Shorkot Road.	96,013
6. Chak Jhumra-Hundewali.	13,78,950
7. Shershah-Bhakkar.	22,563
8. Shorkot Road Hundewali.	1,00,755
9. Shahdara Bagh-Kila Sheikhupura.	1,25,261
10. Qila Sheikhupura-Sangla Hill.	2,47,279
11. Qila Sheikhupura-Shorkot Road.	4,56,548
12. Sangla-Hills. Wazirabad.	2,73,527
13. Wazirabad-Sialkot.	2,03,495
14. Sialkot Narowal	1,12,727
15. Shahdara Bagh-Narowal.	1,09,167
16. Jassar-Chak Amru.	72,007
17. Gandasingwala-Kasur.	1,414
18. Kasur-Raiwind.	11,280
19. Pakpattan-Kasur.	1,35,719
20. Loss caused due to suspension on other sections not affected by flood.	29,00,000
Total.	75,20,304
Say.	75,00,000.





MAP OF THE PUNJAB.

SCALE: 1" = 32 MILES.

AREA FLOODED IN 1950: 