INDIA

MINISTRY OF WATER RESOURCES GOVERNMENT OF INDIA

DEPARTMENT OF AREA DEVELOPMENT STATE GOVERNMENT OF UTTAR PRADESH

FEASIBILITY STUDY
ON
IRRIGATION AND DRAINAGE
DEVELOPMENT OF
SHARDA CANAL CAD PROJECT

VOLUME II - 1

ANNEXES

NOVEMBER 1991

Japan International Cooperation Agency

AFT 91 - 47

No. 02





23/64

INDIA

MINISTRY OF WATER RESOURCES GOVERNMENT OF INDIA

DEPARTMENT OF AREA DEVELOPMENT STATE GOVERNMENT OF UTTAR PRADESH

FEASIBILITY STUDY
ON
IRRIGATION AND DRAINAGE
DEVELOPMENT OF
SHARDA CANAL CAD PROJECT

VOLUME II - 1

ANNEXES

NOVEMBER 1991

Japan International Cooperation Agency

FEASIBILITY STUDY ON IRRIGATION AND DRAINAGE DEVELOPMENT OF SHARDA CANAL CAD PROJECT

LIST OF REPORTS

EXECUTIVE SUMMARY

VOLUME I

MAIN REPORT

VOLUME II - 1 ANNEXES

ANNEX-A METEOROLOGY AND HYDROLOGY

ANNEX-B GEOLOGY AND GEOHYDROLOGY

ANNEX-C SOIL AND LAND CAPABILITY CLASSIFICATION

ANNEX-D SOCIO-ECONOMY

ANNEX-E AGRICULTURE

VOLUME II - 2 ANNEXES

ANNEX-F IRRIGATION

ANNEX-G DRAINAGE

ANNEX-H COMMAND AREA DEVELOPMENT

ANNEX-I SELECTION OF REPRESENTATIVE AREA

ANNEX-J IMPLEMENTATION PLAN AND PROJECT COST

ANNEX-K PROJECT EVALUATION

ANNEX-L MODIFIED PLAN ON THE BASIS OF COMMENTS BY

THE GOVERNMENT OF INDIA

VOLUME III DRAWINGS

ABBREVIATIONS

Board of Revenue, UP BOR

CAD Command Area Development

Command Area Development Authority **CADA**

CCA Culturable Command Area Central Ground Water Board **CGWB**

Food and Agriculture Organization, United Nations **FAO**

Gross Domestic Product **GDP** Gross National Product **GNP** Government of India GOI

Government of Japan GSI Geological Survey of India (Central)

Ground Water Board **GWB**

GOJ

GWD Ground Water Department Irrigation Department, UP ID

India Meteorological Department (Central) **IMD**

IWC Irrigation Work Circle

ЛСА Japan International Cooperation Agency

On-Farm Development **OFD**

RSAC Remote Sensing Application Center, UP

SI Survey of India

UNDP United Nation Development Programme

Uttar Pradesh UP

USDA United States, Department of Agriculture

ABBREVIATIONS OF MEASUREMENT

Lengtl	1		Electrical Measures
cm	=	Centimeter	V = Volt
m	==	Meter	A = Ampere
km	=	Kilometer	Hz = Hertz (cycle)
ft	==	Foot	W = Watt
yd	=	Yard	kW = Kilowatt
			MW = Megawatt
<u>Area</u>			GW = Gigawatt
cm ²	-	sq.cm = Square centimeter	
m ²	==	sq.m = Square meter	Other Measures
ha	=	Hectare	% = Percent
km ²	===	sq.km = Square kilometer	PS = Horsepower
		5 4	o = Degree
3.7 - Januar			= Minute
Volum		cu.cm = Cubic centimeter	" = Second
cm ³	=		°C = Degree centigrade
1	=	lit = liter	10 ³ = Thousand
kl 3	=	Kiloliter	10^5 = Lakh
m ³	==	cu.m = Cubic meter	10 ⁶ = Million
gal.	==	Gallon	10^7 = Crore
MCM	==	Million Cubic Meters	10 ⁹ = Billion (milliard)
			- Dillon (minate)
Weigh	<u>t</u>		
mg	=	Milligram	Derived Measures
g	=	Gram	$m^3/s = m^3/sec = Cubic meter per second$
kg	=	Kilogram	cusec = Cubic feet per second
ton	=	Metric ton	mgd = Million gallon per day
lb	==	Pound	kWh = Kilowatt hour
			MWh = Megawatt hour
<u>Time</u>			GWh = Gigawatt hour
sec	==	s = Second	kWh/yr = Kilowatt hour per year
min	=	Minute	kVA = Kilovolt ampere
hr	=	Hour	BTU = British thermal unit
d	=	Day	
yr	=	Year	Money
3.	_	. VIII	Rs. = Indian Rupees
			US\$ = US dollar
			Yen = Japanese Yen

CONVERSION FACTORS

	From Metric System		Metric System	To Metric System		
Length	1 cm	=	0.394 inch	1 inch	==	2.54 cm
_	1 m	=	3.28 ft = 1.094 yd	1 ft	=	30.48 cm
	1 km	=	0.621 mile	1 yd	=	91.44 cm
				1 mile	=	8 furlongs
					=	5,280 feet
					=	1.609 km
				1 furlong	=	201.17 m
Area	1 cm ²	=	0.155 sq.in	1 sq.ft	=	0.0929 m ²
	1 m ²	=	10.76 sq.ft.	1 sq.yd	==	0.835 m^2
	1 ha	=	2.471 acres	1 acre	=	0.4047 ha
	1 km ²	=	0.386 sq.mile	1 sq.mile	=	2.59 km^2
Volume	1 cm ³	==	0.0610 cu.in	1 cu.ft	=	28.32 lit
	1 lit	=	0.220 gal. (imp.)	1 cu.yd	=	0.765 m^3
	1 kl	==	6.29 barrels	1 gal. (imp.)	=	4.55 lit
	1 m^3	=	35.3 cu.ft	1 gal. (US)	=	3.79 lit
	$10^6 \mathrm{m}^3$	=	811 acre-ft	1 acre-ft	=	1,233.5 m ³
Energy	1 kWh	=	3,413 BTU	1 BTU	=	0.293 Wh
Temperature	۰C	==	(°F-32) 5/9	οF	=	1.8°C + 32
Derived Meas	ures					
	1 m ³ /s	=	35.3 cusec	1 cusec	=	0.0283 m ³ /s
•	1 kg/cm ²	=	14.2 psi	1 psi	=	0.703 kg/cm ²
	1 ton/ha	=	891 lb/acre	1 lb/acre	=	1.12 kg/ha
•	10^6 m^3	=	810.7 acre-ft	1 acre-ft	=	1,233.5 m ³
	1 m ³ /s	=	19.0 mgd	1 mgd	=	0.0526 m ³ /s

ANNEX-A METEOROLOGY AND HYDROLOGY

FEASIBILITY STUDY ON IRRIGATION AND DRAINAGE IMPROVEMENT OF SHARDA CANAL CAD PROJECT

ANNEX - A METEOROLOGY AND HYDROLOGY

TABLE OF CONTENTS

				Page
1.	Intro	duction		A-1
2.	Gene	ral -Sea	ason and Weather of Uttar Pradesh State	A-2
	2.1	Season		A-2
	2.2	Weather	r in Relation to Crops	A-2
3.	Mete	orology		A-4
	3.1	Data	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	A-4
		3.1.1	Rainfall Data	A-4
		3.1.2	Meteorological Data	A-4
	3.2	Climate	in the Sharda Canal Command Area	A-5
	3.3	Rainfall		A-6
		3.3.1	Rainfall Characteristics	A-6
		3.3.2	Rainfall Intensity	A-7
4.	Hydr	ology	***************************************	A-8
	4.1	Data	,	A-8
		4.1.1	Sharda River	A-8
		4.1.2	Other Rivers	A-8
	4.2	Sharda l	River Discharge	A-9
		4.2.1	Outline of the Sharda River	A-9
		4.2.2	Discharge Characteristics	A-9
		4.2.3	Probable Discharge	A-10
	4.3	Other R	iver Discharge	A-10
		4.3.1	Outline of Other Rivers	A-10
		4.3.2	Available Discharge from the Sai River for Irrigation	A-11
		4.3.3	Flood Discharge	A-11

	4.4	Other Water Sources for Irrigation -Lakes and Ponds	A-1
		~	A-1
	4.5	Water Quality	A-1
5	Water	Balance Study	A-1
	5.1	Basic Conditions	A-1
	5.2	Sharda Canal System	A-1
		5.2.1 General Features of the Main Canal System	A-1
		5.2.2 Rostering of Main Canal	A-1
		5.2.3 Actual Water Supply of Main Canal System	A-1
		5.2.4 Simulation of Water Supply of the Sharda Canal	A-2
	5.3	Water Balance by Representative Area	A-2
: .	•	5.3.1 Hydrological Condition by Study Area	- A-2

<u>LIST OF TABLES</u>

Table A.1	List of Rainfall Data	A-26
Table A.2	List of Meteorological Data	A-27
Table A.3	Climate of Sharda Command Area (1/4 - 4/4)	A-28
Table A.4	Normal Rainfall in/around the Sharda Canal Command Area	A-30
Table A.5	Probability of Rainfall in the Past (1/5 - 5/5)	A-31
Table A 6	Dependable Annual Rainfall by District	A-36
Table A.7	Drought Year by District	A-37
Table A.8	Probability of Discharge of the Sharda River	A-38
Table A.9	Estimation of Flow and Flood of the Sai River	A-39
Table A.10	Water Quality in the Sharda Irrigation System	A-40
Table A.11	Comparison of Roster and Actual Discharge	
	of the Main Canal System	A-41
Table A.12	Weekly Comparison of Actual & Roster Discharge	
	- 1990 Kharif(1/8 - 8/8)	A-42
Table A.13	Weekly Comparison of Actual & Roster Discharge	
	- 1989/90 Rabi(1/8 - 8/8)	A-50
Table A.14	An Example of Re-distribution of Water	
	through Nagra Escape (1/2 - 2/2)	A-58
Table A.15	Irrigation Efficiency by Canal System with/without Project	A-60
Table A.16	Water Distribution under Present Condition (1/2 - 2/2)	A-61
Table A.17	Water Distribution under Improved Condition by CAD Works	
	and Wireless Communication System (1/2 - 2/2)	A-63
Table A.18	Water Distribution under Improved Condition and with	
	Ground Water Development Rate of 35 % (1/2 - 2/2)	A-65
Table A.19	Water Distribution under Improved Condition and with	•
	Ground Water Development Rate of 50 % (1/2 - 2/2)	A-67
Table A.20	Water Distribution in Sarojini Nagar Study Area	
	under Present Condition - 1989/90 Rabi	A-69
Table A.21	Water Distribution in Sarojini Nagar Study Area	
	under Present Condition - 1989/90 Kharif	A-70
Table A.22	Water Distribution in Sataon Study Area	
	under Present Condition - 1989/90 Rabi (1/4 - 4/4)	A-71
Table A.23	Water Distribution in Sataon Study Area	
•	under Present Condition - 1989/90 Kharif (1/4 - 4/4)	A-75
Table A.24	Water Distribution in Sursa Study Area	
	under Present Condition - 1989/90 Rabi (1/2 - 2/2)	A -79

Table A.25	Water Distribution in Sursa Study Area	
	under Present Condition - 1989/90 Kharif (1/2 - 2/2)	A-81
Table A.26	Water Distribution in Purwa Study Area	
	under Present Condition - 1989/90 Rabi (1/2 - 2/2)	A-83
Table A.27	Water Distribution in Purwa Study Area	
	under Present Condition - 1989/90 Kharif (1/2 - 2/2)	A-8.
Table A.28	Ground Water Potential by Study Area	A-87

LIST OF FIGURES

Fig.A.1	Temperature and Relative Humidity	
	in the Sharda Canal Command Area (1/2 -2/2)	A-88
Fig A.2	Wind Direction in the Sharda Canal Command Area (1/4 - 4/4)	A-90
Fig A.3	Rainfall Distribution in/around the Sharda Canal Command Area	A -94
Fig A.4	Weekly Discharge of the Sharda River at Banbassa (1960 - 1990)	A-95
Fig.A.5	Annual Discharge of the Sharda River at Banbassa (1960 - 1990)	A-96
Fig A.6	Proposed Discharge of the Sharda River at Banbassa	
	by Roster and Thomas Method	A-97
Fig A.7	The Sharda Irrigation System	A-98
Fig A.8	Comparison of Actual and Roster Water Level of	
•	Sharda Sagar Reservoir	A-99
Fig A.9	Water Volume Stored in Sharda Sagar Reservoir	A-100
Fig A.10	Hydrological Characteristics of Sarojini Nagar Study Area	A-101
Fig A.11	Hydrological Characteristics of Sataon Study Area	A-102
Fig A.12	Hydrological Characteristics of Sursa Study Area	A-103
Fig A.13	Hydrological Characteristics of Purwa Study Area	A -104
	the control of the co	* * * *

the state of the s

ANNEX-A METEOROLOGY AND HYDROLOGY

1. Introduction

The objective of meteorological and hydro logical study is the compilation of meteorohydrological data and assessment of surface water resources for the use in the agricultural study, irrigation water demand study, flood damage study, water supply and demand balance analysis and other engineering studies.

In Chapter 2, general characteristics of weather in Uttar Pradesh were mentioned. Agro-climatic season and weather in relation to crops were described in particular.

In Chapter 3, general climate of the Sharda Canal Command Area was discussed in relation with general climatic characteristics of India with special attention to agro-climate. Rainfall characteristics in the Sharda Canal Command Area were also analyzed in this Chapter.

In Chapter 4, characteristics of water sources of the Sharda Canal Irrigation System were described. Outline, discharge characteristics, probable discharge both in terms of flood and availability (low flow) were discussed. Availability of water from ponds/lakes was examined and water quality of those sources were checked and discussed as well.

In Chapter 5, hydrological condition and characteristics of the Sharda Canal Command Area were described. A hydrologic model was introduced for explaining hydrological characteristics and/or constraints for the four Representative Areas, viz., Sarojini Nagar Study Area in Lucknow District, Sataon Study Area in Rae Bareli District, Sursa Study Area in Hardoi District and Purwa Study Area in Unnao District.

Balance of water demand and supply for the Sharda Main Canal System was examined using actual discharge record of latest five years not only for the total volume but also weekly distribution of water. Some operational losses were pointed out and countermeasures were also discussed. Simulation of water balance under with-project condition and without-project condition were examined and potential of water sources of the Sharda Canal Command Area including ground water was estimated.

40.00

in a control of the first production of

2. General - Season and Weather of Uttar Pradesh State -

2.1 Season

From agricultural point of view, the year is divided into two seasons, Rabi and Kharif. Nominally, Rabi starts on 1st of October and ends on 31st March while Kharif starts on 1st of April and ends on 30th September. Actually, of course, there is overlapping of crops of the two seasons to an appreciable extent.

Kharif crops are sown from early June to early July depending on rainfall. Kharif season opens earliest in the eastern part of the state and progresses westward as the monsoon advances. The harvest, however, matures earlier in the western parts and later in the eastern parts as dry season comes earlier in the former. As the monsoon recedes, western parts becomes ready earlier for Rabi sowing which is carried out from late September to November. The harvesting of Rabi crops takes place from March to April.

Sugarcane, the most important cash crop of the state is an year round crop and covers both seasons. It is sown from February to March and harvested from November to March next year. A variety of sugarcane is also sown in October but it is not widely planted.

2.2 Weather in Relation to Crops

The annual average rainfall in the plains varies from about 25 cms in south western parts to about 150 cms in the sub-Himalayan belt. Almost 75% or more of this rainfall is concentrated during the monsoon months, the balance occurring during the winter. There is thus no arid part of the state which may be wholly dependent on artificial irrigation. From the cultivator's point of view, the distribution of rainfall is more important than its total annual magnitude. Rainfall at the wrong time may actually do a great deal of harm. The ideal weather conditions of two seasons are described below:

(1) Kharif

There should be some rainfall at the end of May or the beginning of June so that ploughing can be started as soon as possible. Heavier rainfall is required later in June to get the land thoroughly wetted, followed by a period of fine weather for tillage and sowing.

During July and August, there should be considerable rain broken by bright intervals lasting not more than seven to ten days at a stretch. Similar weather with lesser rainfall is

required in September for Kharif crops. A few showers at the end of September are, however, essential for the preparation of land for Rabi.

In areas where late rice is sown this distribution is slightly modified. Generally more rain and less sunshine are required. A very heavy rainfall is necessary towards the end of July for transplantation. August and September should be wet and rainfall in early October would also be required.

(2) Rabi

Assuming that September rainfall has left sufficient moisture in the soil, the next requirement is that the air should cool down rapidly so that the soil temperature falls to that suitable for Rabi germination. This takes place when the sky is clear and there is a steady west wind. During November and early December weather should remain clear and get steadily cooler. About the middle of December a light fall of rain is beneficial. A second fall is desirable in the first half of January and a further light fall in February will benefit the crops. It is extremely important that winter rain should be broken by clear weather as continuously drizzling or cloudy weather results in wide spread plant diseases. The rest of the season should be dry and free from hailstorms. In March the west wind should blow steadily to ripen the grains but should not be too strong otherwise they would not attain their maximum size and weight. As soon as Rabi crops are threshed, rainfall will again be good for young sugarcane plants and for preparation of land for Kharif.

(3) Effect of abnormal or scanty rainfall

Kharif crops can usually stand up to three weeks of dry weather without very serious damage. The actual duration would vary with the type of crop, type of soil, moisture present in the soil at the beginning of the dry spell, preparation of field and maturing. Excessive rain is most harmful just after sowing and when the crop is flowering. In the middle of the season it is generally not particularly harmful to Kharif crops.

The most serious danger for Rabi crops is that the soil may be too dry for sowing as a result of a dry and hot September. "Paleo" irrigation (i.e. irrigation of a field prior to the sowing of a crop) is then the only means of preparing land for sowing. With all the irrigation facilities available, Rabi crops are not likely to be good in such an year. Without the extensive irrigation facilities available it would result in famine. On the other hand, continuation of rainfall late into November may also be harmful as it delays Rabi sowing and may make it too late for the sowing of some of the crops.

The effect of failure of winter rains is not so serious. Yield is reduced in all areas but total failure would result in dry higher lands only. Rainfall soon after germination is undesirable as it weakens plant growth. Continuous drizzling or cloudy weather in December, January, is harmful as it leads to wide spread plant diseases, particularly "rust" which attacks wheat grain.

Premature dry winds or too strong winds shrivel up the grain and reduce yield. Frost usually occurs in early January and is not very harmful except for arhar, poppy and tobacco, while gram and a few other crops may also suffer to some extent. A late frost in late January or early February may however cause widespread damage. This is, fortunately not a destruction of the crop after the grain has formed. Usually, the occurrence of a hail storm is localized and though causing considerable local distress, is seldom a wide spread calamity.

3. Meteorology

3.1 Data

3.1.1 Rainfall Data

Several kinds of Rainfall data in/around Sharda Canal Command were collected during Phase I and II Field Work. Rainfall data of eleven Districts viz., Nainital, Pilibhit, Bareilly, Shahjahanpur, Kheri, Hardoi, Sitapur, Barabanki, Unnao, Lucknow and Rae Bareli were collected. Additionally, rainfall data of five more districts adjacent to the Command Area were collected. They were Pithoragarh, Pratapgarh, Faizabad, Sultanpur and Allahabad. The former consists of daily, monthly data for 25 years and monthly normal which is average monthly rainfall of latest 50 years, while the latter is composed of only normal rainfall.

Rainfall data of major observatories in UP which are distributed three to five numbers per District are compiled by Board of Revenue, UP in Lucknow. Some other Departments keep their own observatories for specific purposes and they can be utilized as well. Contents of rainfall data are shown in Table A.1.

3.1.2 Meteorological Data

Meteorological data are observed and compiled by India Meteorological Department(IMD). In the Sharda Command Area, IMD has three meteorological observatories, i.e., Lucknow, Shahjahanpur and Hardoi. Data from Kanpur which is located

closely in the west of Unnao can be used to represent climatic conditions of lower and western reach of the Command Area. These data were collected for period of 1986 to 1990.

Meteorological data are composed of temperature(maximum, minimum, average), relative humidity(-do-), wind speed, wind direction, sunshine hours and evaporation. Data of sunshine hours themselves are available only for Lucknow. Oktas which expresses cloudiness by eight degrees are observed in place of sunshine hours in other observatories. Evaporation data are available only for Lucknow too. However evapotranspiration can be estimated by some empirical equations such as Penman Method, Braney-Criddle Method, etc. which are introduced in FAO Irrigation and Drainage Paper No.24, "Crop Water Requirement". These estimated evapotranspiration will be used to calculate water requirements for irrigation. Contents of meteorological data are summarized in Table A.2.

3.2 Climate in the Sharda Canal Command Area

The State of UP lies under semi-arid climate zone of semi-tropical area, characterized by four distinctive season as follows;

- i) dry winter season from January to February,
- ii) comparatively dry but hot season from March to May,
- iii) monsoon season from June to September, and
- iv) post monsoon season from October to December.

No major difference by place is seen in climate of the Sharda Command Area as a whole. The climatic characteristics are mentioned below.

January is usually the coldest month of the year when atmospheric temperature goes below 10°C. Then the minimum temperature gradually rises up to 25 to 27°C in May, and then is stabilized till September, which means that heat balance between atmosphere and soil is kept stable during these five months.

The maximum temperature rises over 40°C in May, the hottest month of the year. Also the variation of temperature in a day is the biggest in this month which causes the lowest relative humidity of 20% and the maximum wind speed of 4 to 5 m/sec which forms dry and dusty condition of the Area. Such a low relative humidity is caused by low content of soil moisture, which is almost exhausted by evaporation during long dry season.

According to the soil survey conducted on fallow land during the first Field Work period (1990 October), a surface layer up to 80cm showed dried-up condition, which explains that almost all the capillary water in the root zone is evaporated during dry season.

In June, rainfall begins to grow and relative humidity goes up accordingly, which suppress the maximum temperature. During cold season, north-westerly wind excels, on the other hand, easterly winds prevails during the hottest season. Annual evaporation in Lucknow is about 1,500mm which is 1.5 to 2 times as much as annual rainfall. Average minimum evaporation of 1 to 2 mm/day is observed in January to February, and average maximum evaporation of 9mm/day is observed in April to May. Climatic information of the past 4 to 5 years at 4 stations is shown in Table A.3 and illustrated in Fig. A.1 and Fig. A.2.

3.3 Rainfall

3.3.1 Rainfall Characteristics

In India rainfall is generally erratic and ill distributed. About 70% of annual rainfall in most part of the country is provided by southeast monsoon. The normal rainfall in/around the Sharda Command Area is shown in Table A.4 and Fig. A.3. The maximum annual rainfall in the Area is 1,556 mm observed in Nainital, while the minimum is 838 mm in Unnao.

Generally, rainfall in the Area is concentratedly distributed in Kharif up to 90% of annual rainfall. The peak of rainfall distribution is seen in July and August in which 60% annual rainfall is observed. Such a concentrated distribution of rainfall brings about difficulty for irrigation practice and achieving high crop intensity, in other words, productivity. The minimum rainfall of the year is observed in April and November.

Total rainfall by season is summarized in Table A.5. According to this table, dry/wet season and its probability can be known. Also dependable rainfall by season calculated by Thomas Method is tabulated in Table A.6.

Since the Sharda Canal has vast command area, rainfall distribution is different by location. Table A.7 shows drought year by district for latest 25 years. 1965 Kharif, 1968/69 Rabi and 1987 Kharif are considered the most severe drought years when both rainfall over the Area and discharge of the Sharda River are insufficient. 1972 Kharif, 1972/73 Rabi, 1975 Rabi, 1979 Kharif and 1984/85 Rabi are also drought years in view of rainfall on to the Area.

3.3.2 Rainfall Intensity

(1) Probable rainfall

Considering provision of proper drainage system or flood control system, assessment of rainstorm which is expressed by some parameters such as rainfall intensity, depth-duration curve, etc is indispensable. Using rainfall data collected in this Study, probable maximum rainfall of 1 in 5 year and 1 in 10 year by duration were calculated by Thomas Method which is popular method for determining probable rainfall by normal distribution. Results related to four Representative Areas are as follows:

24 hours rainfall	1 in 5 year (80%)	1 in 10 year (90%)
Hardoi (Sursa Area)	158 mm	200 mm
Lucknow(Sarojini Nagar Area)	120 mm	148 mm
Purwa(Purwa Area)	140 mm	167 mm
Rae Bareli(Sataon Area)	160 mm	205 mm
48 hours rainfall	1 in 5 year (80%)	1 in 10 year (90%)
Hardoi (Sursa Area)	210 mm	265 mm
Lucknow(Sarojini Nagar Area)	165 mm	210 mm
Purwa(Purwa Area)	200 mm	228 mm
Rae Bareli(Sataon Area)	270 mm	350 mm
72 hours rainfall	1 in 5 year (80%)	1 in 10 year (90%)
Hardoi (Sursa Area)	250 mm	310 mm
Lucknow(Sarojini Nagar Area)	207 mm	260 mm
Purwa(Purwa Area)	220 mm	275 mm
Rae Bareli(Sataon Area)	270 mm	350 mm

(2) Rainfall Intensity

Maximum t-hour rainfall can be estimated by Sherman's equation using 24-hour rainfall:

$$R_t = R_T (t/T)^k$$

where, R: maximum t-hour rainfall

RT: Maximum T-hour rainfall as standard. Here, 24-hour maximum

rainfall is adopted.

k: constant, normally 0.5 is adopted.

According to this formulae, t-hour rainfall in mm for the Study Areas was calculated as shown below:

	Hardoi	Lucknow	Purwa	Rae Bareli
1 hour	32 (41)	24 (30)	29 (34)	33 (42)
4 hour	65 (82)	49 (60)	57 (68)	65 (84)
12 hour	112 (141)	85 (105)	99 (118)	113 (148)
24 hour	158 (200)	120 (148)	140 (167)	160 (205)

Remarks: 1 in 5 year(1 in 10 year) unit; mm

4. Hydrology

4.1 Data

4.1.1 Sharda River

Discharge data of the Sharda River at Banbassa were collected during Field Work. Measurement of river discharge is conducted by Irrigation Department of UP every day. Daily discharge is calculated to weekly average which is utilized as basis of rostering. Accordingly, probable discharge for irrigation planning is obtained by week.

In this Study, weekly discharge from 1960 to 1990 and daily discharge from 1986 to 1990 were collected from Irrigation Department.

4.1.2 Other Rivers

The Sai River and the Loni Nadi ("Nadi" means small rivers or big drains in Hindi) are major rivers in the Study Areas other than the Sharda River. The Sai River is the main drainage river covering Districts in the south from Hardoi.

The Sai River flows near Sursa Study Area, Sarojini Nagar Study Area and Sataon Study Area. There are a few gauging stations along the Sai River. The first one is located at Auras in northern Unnao District operated by Irrigation Department from 1985. The second and the third station are located in Rae Bareli and in Jaunpur both of which are under control of Central Water Commission (CWC).

The Loni river flows near Purwa Study Area as the main drainage river. There is a gauging station operated by Irrigation Department in Pieralipur in Rae Bareli District.

Daily discharge data of the Sai River at Auras were collected during this Study covering six years from 1985, while discharge data of Pieralipur were collected for four years from 1987 for the Loni Nadi. Discharge data for stations under CWC Have not been obtained. Some probability analysis was reported by Irrigation Department as "Hydrological Report of Sai River" (1983) in which ten-day discharge from 1971 to 1980 at Rae Bareli and Jaunpur are available. These data can be used for estimating available water and flood in conjunction with discharge data at Auras.

4.2 Sharda River Discharge

4.2.1 Outline of the Sharda River

The Sharda River flows down along the international boundary of India and Nepal, and irrigation water is diverted for the Sharda Canal Irrigation System at Banbassa Headworks in Nainital District. Catchment area of the Sharda River at Banbassa is 14,960 km², half of which is located in Nepal. The Sharda River originates from the Himalayan Range and joins the Ghaghara River in the east of Sitapur.

4.2.2 Discharge Characteristics

Annual distribution of discharge from the Sharda River resembles annual rainfall distribution. The peak discharge is recorded in August. Average weekly discharge of the past 30 years at Banbassa is illustrated in Fig. A.4. The Sharda River discharges most of annual discharge within four months from July to October. The average discharge is 20,000 cusec (566 cumec) and the base flow is estimated 4,500 cusec (127 cumec) from the lowest discharge recorded in February. Fluctuation of annual discharge by year is shown in Fig.A.5. Tendency of fluctuation is similar to dry/wet year by rainfall distribution. As for recent Kharif seasons, year of 1987 and 1989 were drought years of 1 in 33 years and 1 in 7 years respectively. On the other hand, year of 1988 was wet year of 1 in 7 years. In Rabi

season, 1987/88 was drought year of 1 in 10 years and 1985/86 was wet year of 1 in 44 years. Probability of actual discharge from 1960 to 1990 by season is summarized in Table A.8.

4.2.3 Probable Discharge

In India, 75% probable discharge (dependable discharge in three years out of four years) is regarded as "available water" (proposed discharge) for irrigation planning. As for the Sharda Canal Project, irrigation water distribution schedule i.e., Roster which is revised every year by Irrigation Department of UP is based on 75% probable discharge calculated from observed discharges of latest 10 years.

75% probable discharge calculated by Thomas Method based on weekly discharge data from 1960 to 1990 and proposed discharge mentioned in Roster are compared in Fig. A.6. Judging from the results, the peak discharge of Roster is a bit bigger than calculated value, but almost coincides in dry season. It can be said that the proposed discharge (available water) mentioned in Roster is proper as a whole.

4.3 Other River Discharge

4.3.1 Outline of Other Rivers

(1) Sai River

The Sai River is one of the major tributaries of the Gomti River. It originates near the adjoining boundaries of Kheri and Hardoi District. It travels in District of Hardoi, Unnao, Lucknow, Rae Bareli, Pratapgarh and Jaunpur. Total length of the river is 760km and the catchment area of the basin is 12,850 km² at the confluence in the Gomti River covering 14 blocks fully and 50 blocks partially. Because of gentle topography of the basin, the river course meanders and frequent floods hit the surrounding area.

(2) Loni Nadi

Total length of Loni Nadi is 156km. It originates near Makhi in Unnao District and joins the Ganges River in Rae Bareli. Total catchment area of the basin comprises 1,180 km². Improvement has been done for some parts by Irrigation Department of UP.

4.3.2 Available Discharge from the Sai River for Irrigation

Available water for irrigation can be estimated by probability analysis of actual discharge. From locational condition, water from the Sai River can be utilized to some extent of Sarojini Nagar Study Area and Sataon Study Area. Catchment area of the Sai River at proposed intake point is 4,030 km² for Sarojini Narga (crossing point of Mohanlalganj-Maurawan Road) and 5,080 km² for Sataon (crossing point of Gurbuxganj-Bachhiowan Road).

Dependable low flow at these two points can be interpolated from those at Auras(CA=1,950 km²) for which discharge data of six years from 1985 to 1990 are available and Rae Bareli(CA=6,201 km²).for which 75% (3 in 4 years) dependable discharge for 1971 to 1980 is available. As for low flow at Auras, the minimum of five years can be regarded as 75% to 80% dependable low flow. Table A.10 shows approximate low flow of 75% to 80% at Sarojini Nagar and Sataon which is interpolated proportionally to catchment area. Judging from the results, the lowest low flow of 75 to 80% dependability is about 2 cumec at Sarojini Nagar and Sataon Study Area.

4.3.3 Flood Discharges

Flood discharge of the Sai River can be estimated from Table A.9 where the maximum flow during 1985 to 1990 is listed for Sarojini Nagar and Sataon Study Area. The maximum flow is usually recorded in September and October when discharges of 150 to 200 cumec were observed at Auras. Proportionally to the catchment area at Sarojini Nagar and Sataon, flood discharge there can be extrapolated to be 400 to 500 cumec.

The Loni Nadi has only one gauging station at Pieralipur which started measurement in 1985 only and actual discharge data are available from 1987. Out of four years from 1987 up to 1990, the maximum flow (101cumec) was recorded in August of 1990. Maximum discharges in cumec by month are written below:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
5.8	7.6	3.8	3.7	1.5	12.9	54.3	101.0	69.1	16.0	4.3	4.4

4.4 Other Water Sources for Irrigation - Lakes and Ponds -

(1) Applicability

Other than irrigation water from canal, ground water, and river water, possibility of development of supplemental water resources were re-examined. Water from lakes or natural ponds has been utilized by place where the above-mentioned irrigation facilities are not available.

Generally, irrigation by water of lakes/ponds is conducted in small scale because of; their i)low dependability, ii)uneasiness of application. Quantity of available water depends on rainfall itself, which leaves this kind of irrigation unreliable and supplemental.

Lakes/ponds are normally formed along perished river course or in depression and their water depth is shallow. The edge of surface of water moves continuously according to weather condition, and suction point is not stable, which brings about uneasiness of application of irrigation.

(2) Limitation of development

Water from lakes and ponds can be applied to certain extent. As mentioned before, 90% of annual rainfall is observed during rainy season(June to September). On the other hand, annual evaporation comes 1.5 to 2 times of annual rainfall, out of which 60% is observed in dry season, viz., from October to May. Potential evaporation rate (ETO) estimated by Modified Penman Method is 1,500mm to 1,600mm in Sharda Command Area, of which 900 mm is estimated to be evaporated by beginning of next rainy season. Seepage rate from lakes/ponds is 500 mm/year which is adopted by Ground Water Department UP in course of estimation of ground water recharge. Seepage from lakes/ponds during dry season (8 months) is thus estimated 300mm. As a result, standing water is estimated to be reduced by 1,200mm during dry season. If water depth of a pond at the beginning of dry season is more than 1,200mm, the pond is supposed to be perennial.

Accordingly, total volume of water below 1.2 m deep can be regarded as supplemental water source. Further extraction of water will damage ecological balance and should not be done. Topographic survey is required to estimate this volume and irrigated area. From qualitative point of view, water from lakes/ponds is applicable for irrigation use both in terms of salinity and alkalinity.

(3) Utilization of lakes/ponds water in Representative Areas

Irrigated area and other features about lakes/ponds irrigation are mentioned in Milan Khasra of 1989/90, which are summarized below:

Study Area	Irrigated Area by Lakes/Ponds (ha)	Total Irrigated Area (ha)	Area of Lakes & Ponds (ha)	No. of Lakes & Ponds (nos.)		
Sarojini Nagar	483	13,117	102	116		
Sataon	601	9,934	450	48		
Sursa	139	15,313	411	350		
Purwa	534	10,355	460	115		

Irrigated Area by lakes/ponds becomes the largest value in Sataon Study Area which suffers from severe shortage of irrigation water. Ratio of Irrigated area to Area of lakes/ponds (herein after I/P ratio) indicates dependency on lakes/ponds as irrigation water source.

In Sarojini Nagar Area, I/P ratio is 4.7 which shows high dependency on water of lakes/ponds, while those of Sataon, Sursa and Purwa are 1.3, 0.3 and 1.2 respectively.

Based on 1 in 50,000 topographical maps, catchment area of lakes/ponds is approximately five times as large as themselves. Rainfall in the Study Areas during dry season is from 700mm to 1,000 mm. If rainfall of 700mm gathers into a pond from catchment of five times as large as the pond, water of 4,200 mm in depth is stored and 1,200 mm is diminished naturally as a loss. Taking application loss of 20% into account, about 2,400mm depth of irrigation water can be utilized from this pond, which is nearly three times as much as irrigation requirement of Rabi crops (400 mm).

Judging from these, proposed irrigated area (P.I.A.) by lakes/ponds is estimated to be six times as large the area as perennial lakes/ponds themselves, which is equivalent to I/P ratio of 6.0 Thus it can be said that possibility of utilization of lakes/ponds water is very low in Sarojini Nagar Study Area. Proposed irrigated area by lakes/ponds in 1990/91 Rabi season is shown below:

Study Area	PIA (ha)
Sarojini Nagar	600
Sataon	2,700
Sursa	2,500
Purwa	2,800

4.5 Water Quality

(1) Adopted criteria

In view of adverse effect of irrigation on crop growth, water quality should be assessed particularly on alkalinity (pH) and salinity indicated by electric conductivity (EC). The tolerance against salinity or alkalinity depends on the soil characteristics with respect to drainage, the cations present in water and soil and also on the crop grown. Water quality can be tested in accordance with the procedures listed in FAO Irrigation and Drainage Paper-29 "Water Quality for Agriculture" which is referred in "The Water Management Manual" by Ministry of Water Resources, GOI. It shows that water whose EC is less than 0.7 micro mho brings about no reduction in crop yield even for the most sensitive crops against salinity.

pH is an indicator of the acidity or basicity of a water, but is seldom a problem by itself. The main use of pH in a water analysis is for detecting an abnormal water. According to the FAO Paper No.29, the normal pH range for irrigation is from 6.5 to 8.4.

(2) Quality of Sharda Canal Water

Water quality of Sharda Canal was checked during Phase I &II Field Work. Results are shown in Table A.10. Average EC is 0.255 mmho and pH is 8.4 both of which can be judged normal value and applicable for irrigation purpose.

(3) Water quality in Representative Areas

During Phase II Field Work, water quality survey was conducted in four Representative Area including river water, pond water and drainage canal water (table in the next page). Ground water quality was also tested by Hydro-geologist, the results of which are compiled in Annex B.

	Date	Lakes/Ponds		Drainage Canal		Distributary		Sai River	
Study Area		pН	EC	pH	EC	pН	EC	pН	EC
Sarojini Nagar	04/02/91	8.5	0.25	8.5	0.51	8.5	0.24	8.8	0.53
Sataon	05/02/91	8.6	0.36	8.3	0.61	8.7*	0.25	8.7	0.54
Sursa	06/02/91	8.6	0.24	8.1	0.81	9.1*	0.21	9.2*	0.36
Purwa	08/02/91	8.6	0.35	8.3	0.61	8.4	0.24	· .	

Remarks: * Stagnant water

Judging from the above, water quality of sources in Study Areas can be said normal to slight alkaline, but applicable for irrigation, excluding stagnant water. In Rabi season, all kinds of water tends to stagnate due to low discharge. Stagnant water is apt to be contaminated by accumulation of toxic ions, which results in high pH. Marginal or small farmers who can not afford wells are forced to utilize these high pH water, which makes their farmland deteriorate with alkaline soils.

5. Water Balance Study

5.1 Basic Conditions

It is indispensable to consider hydrologic balance to clarify the process of water logging or salinity/alkalinity.

Water balance within a certain area is generally composed of water movement on the surface and that below ground level. The former consists of precipitation, irrigation water from canal and natural run-off from upper reach as "Input", and percolation, evapotranspiration and run-off outside the area as "Output". The latter is composed of recharge (deep percolation) and ground water flow inside the area as "Input", and draft of ground water and ground water outflow as "Output".

Figure in next page shows the hydrological balance within a certain segment of land. Each component is explained below:

P: Precipitation

SFin: Surface flow into the area

where, SFin = NFin + Iin

NFin: Natural inflow

Iin: Irrigation water supply

SFout: Surface flow outside

where, SFout = NFout + Dout

NFout: Natural outflow

Dout: Drainage outside the area

ET: Evapotranspiration where, ET = ETO + ETcrop

ETO: Evapotranspiration from non-agricultural land

ETcrop: Evaporation from agricultural land or crop

consumptive use

GD: Gross draft of ground water

<u>R:</u> Gross recharge or deep percolation

where, R = Rr + Rc + Ri + Rt + Rp

Rr: Recharge from rainfall

Rc: Seepage from irrigation canal

Ri: Recharge from surface irrigation

Rt: Recharge from tanks

Rp: Potential recharge from flood prone area and shallow

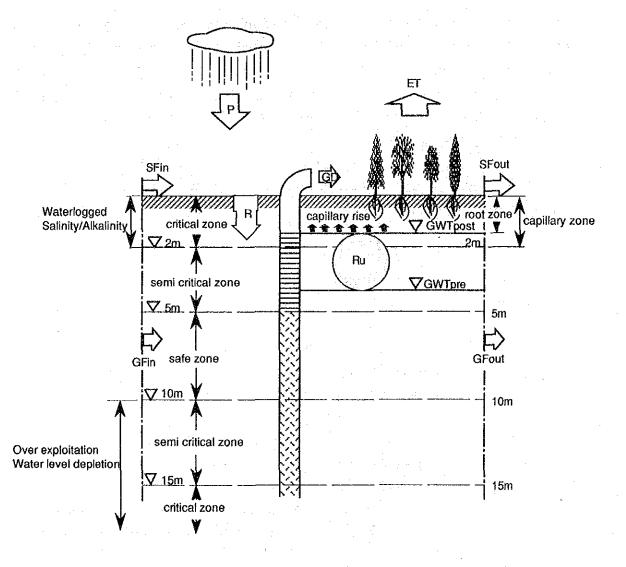
water table area

GFin Ground water inflow

GFout Ground water outflow

GWTpost Post-monsoon ground water table

<u>GWTpre</u> Pre-monsoon ground water table



According to the hydrologic model mentioned above, present condition of Study Area can be explained and appropriate countermeasures for overcoming constraints against high crop productivity will be given.

As for rainfall (P) and evapotranspiration (ET), difference in the Study Area is not distinguished. Also horizontal movement within shallow aquifer is almost negligible because of flat topography in/around the Area. The present condition or constraints against agricultural development can be clarified through evaluation of rate of ground water exploitation (GD), usable recharge(Ru), surface water inflow(SFin) and surface water outflow (SFout). These parameters have close correlation with soil salinity and "water logging" which means saturated soil condition within root zone by capillary rise from shallow ground water table.

From ecological point of view, shallow ground water table is classified into five zones as follows:

- i) Upper critical zone (0 to 2 m); water logging and/or salinity problem occurs due to capillary rise of ground water,
- ii) Upper semi-critical zone (2 m to 5 m),
- iii) Safe zone (5 m to 10 m); as far as ground water table is maintained within this zone, no water logging and/or salinity problem occurs,
- iv) Lower semi-critical zone (10 m to 15 m), and
- v) Lower critical zone (below 15 m); ground water cannot pumped up even if a pump-set were installed below ground level.

Hydrological characteristics and countermeasures against constraints by Representative Area are mentioned in sub-section 5.3.

5.2 Sharda Canal System

5.2.1 General Features of the Main Canal System

The Sharda Irrigation System covers about 1,600 thousand ha of CCA and proposed irrigation area of 384 thousand ha (24% of CCA) in Kharif and 400 thousand ha (25% of CCA) in Rabi season with the maximum design discharge of 11,500 cusec (325 cumec). The Main Canal diverts water directly to four Branches, four Feeders and two channels along its total length of 43 km. During Kharif season, flows are suitably regulated so as to utilize

an average flow of around 10,000 cusec for irrigation and the balance for filling Sharda Sagar Reservoir. In Rabi season when supplies in river are low, the available supplies in Sharda Sagar, Nanak Sagar and Baigul reservoirs are suitably utilized to regulate the canal system. The Sharda Main System is illustrated in Fig. 7 with location of Representative Areas.

5.2.2 Rostering of Main Canal

In Kharif season, the canal system starts functioning from April to the end of June, the supplies in the river are not sufficient to meet the requirements of Main Canal and the canal system runs with reduced supplies. In this period, no supplies are diverted either to fill Sharda Sagar or to feed the Old Sharda Deoha Feeder. With this adjustment, it becomes possible to meet the requirements at bifurcation point, i.e., tail end of the Main Canal. During the period from the beginning of June to the end of September, the supplies in the river are sufficient to maintain the design flow and satisfy the envisaged requirements.

Rabi season starts from October and the river flows are normally sufficient to maintain design head discharge in Sharda Main Canal up to the third week of October. From the last week of October, river flows are less sufficient but the system is able to run efficiently with the support of additional supplies from Sharda Sagar Reservoir through outlet channel. In the period from November to the end of Rabi, when supplies in the Sharda River is very low, optimal and judicious plans are drawn with the play of following flexibilities.

- No supplies are drawn from Main Canal either for feeding Sharda Sagar or serving D.B.Feeder or both, thereby drastically reducing the load on Main Canal.
- ii) Suitable supplies are drawn from Sharda Sagar through outlet channel to serve the areas allocated to Hardoi Branch.
- iii) D.B. Feeder System is served through allocated supplies of Nanak Sagar.
- iv) Shahjahanpur System is suitably supplemented through Baigul Reservoir.

Ultimately, well balanced supplies are maintained in both seasons for the Main Canal System. Similarly, well balanced Rosters are prepared for functioning of Branch systems.

5.2.3 Actual Water Supply of Main Canal System

(1) Main Canal

Total supplied volume through the Main Canal System up to the bifurcation is summarized in Table A.11, where actual supply and proposed supply in Roster are compared for five Kharif seasons and four Rabi seasons. As mentioned before, 1987 Kharif, 1987/88 Rabi and 1989 Kharif season are drought year and actual discharge of the Sharda River did not meet Roster. However the water was extracted sufficiently to the Main Canal in total volume.

Achievement rate of water supply in 1990 Kharif and 1989/90 Rabi are summarized by canal in Table A.12 to Table A.13, where fluctuation of water supply is shown by week. It is noted that actual loss along the Main Canal (shown in Table A.12 (7/8) and Table A.13 (7/8),"Loss up to Bifurcation") is estimated 150% to 300% of the Roster for latest five years, which largely depended on the discharge through Nagra Escape as described later on.

(2) Sharda Sagar Reservoir

Sharda Sagar Reservoir comprises an earthen dam of height 16.15 metres with live capacity of 365MCM which is equivalent to total volume for four weeks of peak discharge of Hardoi Branch in October. In addition to run-off from its own catchment of 127 km², it is also fed from Sharda Main Canal through Old Sharda Sagar Feeder and New Sharda Sagar Feeder.

The water from the reservoir is carried at 13.4 mile (21.4 km) of Hardoi Branch through outlet channel with head discharge capacity of 3,500 cusec. The inflows and outflows from the reservoir are monitored by Irrigation Department of UP according to Roster. Comparison of actual water level of the reservoir and that in Roster for latest three seasons is illustrated in Fig. 8. Storage volume of the reservoir tends to be larger than that in Roster at the end of Roster period due to intensive rainfall on to the catchment. According to actual discharge record of latest five years, Sharda Sagar Reservoir supplied 27% of requirement of Hardoi Branch in Kharif and 23% in Rabi.

Judging from fluctuations of water level from 1985 to 1990 shown in Fig. 9, it can be said that storage capacity of the reservoir is controlled well as a whole.

(3) Nagra Escape

Nagra Escape discharges excessive water of the Main Canal to the Sharda River. Discharge of Nagra Escape is not estimated in Roster and it can be regarded as loss of the Main Canal System. New Sharda Sagar Feeder branches off the Nagra Escape in the north of the Sagar Reservoir. Water to Sagar Reservoir is estimated via Escape when the storage volume is more than that in Roster. This operational loss can be reduced by introducing more effective water management system such as wireless communication system distributing eliminated water to Hardoi Branch from outlet channel of Sagar Reservoir or to Kheri Branch via the Main Canal. Table A.14 shows an example of simulation of re-distributing eliminated water through Nagra Escape to Hardoi and Kheri Branch under condition of 1989/90 Rabi.

The tables in next page show the changes in achievement of water supply against Roster for latest five years in case eliminated water through Nagra Escape is re-distributed to Hardoi and Kheri Branch.

<u>:</u>	Nagra Es (loss 9	-			annel ster %)		•	nax.) ster %)		Kher I/Ro	i ster %)
Kharif							-				
1986	2.9 →	2.4	114	→ '	115	103	 →	103	98	\rightarrow	98
1987	2.1 →	0.0	114	\rightarrow	115	107	\rightarrow	108	96	\rightarrow	96
1988	6.9 →	3.4	132	\rightarrow	150	108	\rightarrow	111	97	$\xrightarrow{\cdot}$	102
1989	1.0 →	0.6	. 110	- →	111	N.A.	→	N.A.	92	\rightarrow	93
1990	8.6 →	5.4	115	\rightarrow	129	N.A.	\rightarrow	N.A.	N.A.	\rightarrow	N.A.
Average	4.5 →	2.4	117	>	124	105	\rightarrow	107	96	\rightarrow	97
Rabi											
1985/86	N.A. →	N.A.	N.A.	\rightarrow	N.A.	N.A.	\rightarrow	N.A.	N.A.	\rightarrow	N.A.
1986/87	12.3 →	1.0	144	\rightarrow	192	102	$\stackrel{\cdot}{\rightarrow}$	115	109	 >	138
1987/88	N.A. →	N,A.	N.A.	\rightarrow	N.A.	N.A.	\rightarrow	N.A.	N.A.	\rightarrow	N.A.
1988/89	9.7 →	1.5	157	\rightarrow	200	105	\rightarrow	117	99	\rightarrow	- 111
1989/90	7.3 →	0.3	112	\rightarrow	143	. 105	- →	113	87	\rightarrow	99
Average	9.8 →	0.9	138	\rightarrow	178	104	\rightarrow	115	98	\rightarrow	116

Remarks: Calculated based upon Roster and actual discharge records by Irrigation Department of UP

As for Kharif season, no major changes can be seen. However in Rabi season, operational loss on Nagra Escape is reduced by 9% of total discharge of the Main Canal and achievement rates for Hardoi Branch and Kheri Branch are enhanced by 10% and 20% respectively. Needless to say, these saved water can be utilized for other irrigation system as per requirements and capacity of canals.

5.2.4 Simulation of Water Supply of the Sharda Canal

Present irrigation system of the Sharda Canal is not good enough to supply sufficient water for crop growth to tail end of canals. A number of constraints are pointed out in this Study such as malfunctioned irrigation facilities, lack of regulators, conventional inequity on water distribution and so on. Following simulation was conducted in order to clarify present condition and constraints on irrigation system of the Sharda CAD Area.

(1) Irrigation Requirement

Irrigation requirements are calculated based upon crop consumptive use. Procedures of determining irrigation requirements are described in Annex-F. Diversion requirements for the Hardoi Canal System reviewed in this Study (IRrev) and those mentioned in Roster (IRros) are compared below.

	IR	rev	IR	ros
	Kharif	Rabi	Kharif	Rabi
1. Hardoi Branch (0 to 53 mile)	1740	1460	1200	790
2. Hardoi Branch (53 mile to tail)	1590	1080	1050	670
3. Lucknow Branch	1260	1100	1130	670
4. Purwa, Unnao, Asiwan Branch	1180	1010	780	500

Remarks: Unit is mm. IRrev was calculated using estimated present irrigation efficiency.

Judging from above table, it can be said that diversion requirements themselves listed in Roster do not satisfy crop consumptive use under present condition of irrigation system, which results in low productivity in the Command Area.

(2) Irrigation Efficiency

Irrigation efficiency was estimated based upon field measurement, discharge record of irrigation canals, reports of other projects and documents widely quoted for irrigation project. Table 16 shows irrigation efficiency of with-project and without-project. Introduction of wireless communication system for water management will improve operation efficiency and conveyance efficiency. Complete or partial lining will enhance conveyance efficiency and modernized facilities and/or on-farm development works will improve application efficiency.

(3) Present Condition

Table A.16 shows present condition of the irrigation system. Actual discharge records of five years by Irrigation Department were used for this simulation. Actual irrigated area (AIA), actual supplied volume (ASV, in other words, actual diverted volume) were calculated to average. According to these figures, field supplied volume (FSV) was estimated. Comparing FSV with field irrigation requirement (FIR), irrigation sufficiency, i.e. achievement rate of water supply against crop water requirements which were estimated based upon crop consumptive use by Modified Penman Method, can be examined. If Irrigation sufficiency is 50%, it means that only half of present irrigated area can be irrigated in full sufficiency.

Irrigation sufficiency for the whole Sharda system is 66% in Kharif and 55% in Rabi. In Kharif season, Hardoi Branch System supplies irrigation water better than Kheri Branch and other systems judging from higher irrigation sufficiency. Actual irrigated area is 80% of proposed area which shows along with irrigation sufficiency that supplied volume covers only 45 to 55% of necessary volume against PIA. Among branch systems under Hardoi Branch, Asiwan Branch and Unnao Branch shows low irrigation sufficiency and low achievement of irrigation area. As a whole, it can be said that lower reach of the system is subject to shortage of irrigation water.

(4) Improved Condition by CAD Works and Wireless Communication System

Table A.17 shows improved condition of the Area by means of on-farm development by CAD (OFD Works), partial lining of Distributary/Minor and introduction of wireless communication system. In Kharif season, irrigation sufficiency will be enhanced up to 100% except Unnao Branch System. Field application efficiency is estimated to increase by 20% by OFD Works, which contributes to the results much. In fact, shortage of water at further farmland from kulabas was observed during field inspection in spite of enough water supply to kulabas. Even in the area after completion of OFD Works, such a condition was seen due to partial lining of watercourse and deterioration of farmland.

In Rabi season shortage of nearly 10% remains at head of the Main Canal and 20 to 30% at head of Branches, which suggests necessity of utilization of other water sources such as ground water. Particularly in Asiwan Branch System, only half of requirements can be satisfied even after completion of improvement. Conjunctive use of canal water and ground water and/or other sources is indispensable for lower reach of the system.

(5) Conjunctive Use of Ground Water

In lower reach of the canal system, ground water has been developed to large extent due to shortage of irrigation water through canals. Supposedly ground water potential in such areas seems to be low and further exploitation is limited. However, command area of a shallow tubewell is only 2.5 to 4 hectares and 40 hectares for a deep tubewell. Therefore, ground water exploitation in CCA and non-CCA do not intervene each other. If water supply through irrigation canal recovers after improvement, farmers will extract water from canals and water from their tubewell can be used to enhance reliability or quantity of irrigation, which will be followed by high yield. Suppose that 50% is the higher limit of ground water development, 30 to 35% is considered to be lower limit of development in order to maintain ground water table within safe zone between three to ten metres. As far as ground water table is kept in safe zone, no capillary rise will reach root zone and no waterlogging will occur.

Table A.18 and Table A.19 shows water balance of conjunctive use of surface water and ground water in CCA. If 50% of usable recharge is exploited, irrigation sufficiency will be fulfilled both in Rabi and Kharif even for proposed irrigation area. In case of ground water development of 35%, PIA is also covered in full sufficiency. Especially in Rabi season, nearly 200% of PIA which is 250% of present irrigated area can be irrigated by 50% of usable recharge of ground water in CCA.

5.3 Water Balance by Representative Area

5.3.1 Hydrological Condition by Study Area

Hydrological characteristics of the four Study Areas based upon the model introduced in sub-section 4.1 are mentioned below:

(1) Sarojini Nagar Study Area

Table 20 and Table 21 show comparison of Roster discharge and actual discharge by irrigation canals of Study Areas for 1989/90 Rabi and 1990 Kharif. Judging from these, Roster discharge was almost satisfied at the head and 72 mile point of Lucknow Branch. However, only 85% of Roster discharge was supplied at the head of Amausi Distributary in Kharif 1990. On the other hand, in Rabi 1989/90, 130% of Roster discharge was supplied at the head of Amausi Distributary, but irrigation water from canal was not still sufficient in lower reach due to low conveyance efficiency of the canal.

Sarojini Nagar Study Area can be divided into three portions according to condition of surface water inflow (SFin) particularly in irrigation water (Iin) and drainage condition (SFout or GD). They are; i) upper reach of Amausi Distributary and Gehru Distributary; ii) left bank of middle reach of Amausi Distributary; and iii) right bank of middle reach and lower reach of Amausi Distributary.

i) Upper reach of Amausi Distributary and Gehru Distributary

Surface water inflow (SFin) viz., irrigation supply(Iin) is small due to higher elevation of farmland and deterioration of canal. Shallow ground water table remains upper "safe zone".

ii) Left bank of middle reach of Amausi Distributary

Irrigation supply (SFin, Iin) is very small and drainage condition (SFout) is also poor. Shallow ground water table exists in upper "semi-critical zone" to "safe zone".

iii) Right bank of middle reach and lower reach

Irrigation supply (SFin, Iin) is small and shallow ground water table is within middle to lower "safe zone".

Judging from above, Sarojini Nagar Area is characterized by low availability of surface irrigation water as a whole. Particularly in middle reach, drainage and usar problem occurs due to its topographic condition, viz., "flat Midland" where ground water table is shallow. In lower reach, surface drainage is applicable in "Upland" adjacent to the Sai River and Quila Mohammad Drain, but ground water potential which is expressed by ratio of Net recharge (85% of Ru) to net draft(70% of GD) shown in Table A.28 is low as well as surface water availability. General hydrological condition is shown in Fig. A.10.

(2) Sataon Study Area

Sataon Study Area is characterized by its low surface water availability(Iin) and also low ground water potentiality (higher Ru/GD). Table A.22 and Table A.23 shows extremely low availability of surface water from irrigation canals which can provide only 20% of required water in 1989/1990 Rabi and 1% in 1990 Kharif. Low potentiality of ground water means less water logging and soil salinity problem. In addition, sandy soils are predominant

in this Area, which restrains capillary rise to the surface of soil profile and no waterlogging is seen here. This Area was selected as "Irrigation Problem Area" along with Sarojini Nagar Study Area. The difference between the two is quantity of "net recharge" shown in Table 25 which is entirely low in this Area, while upper or middle reach of Sarojini Nagar Study Area still have feasible potential of further ground water exploitation. Typical hydrological condition of the area is shown in Fig. A.11.

(3) Sursa Study Area

This Area was selected as "Drainage Problem Area". Poor drainage condition is observed along Hardoi Branch, lower reach of Badaicha Distributary and along Marsa Distributary. Most part of this Area lies in midland, which is characterized by scatteringly distributed ox-bow lakes and ponds.

Judging from the actual discharge data of Badaicha Distributary and Marsa Distributary from 1989 to 1990 shown in Table A.24 and Table A.25, irrigation supply(Iin) proposed in Roster was satisfied in this Area, while surface drainage is poor due to gentle ground slope in lower reach. On the other hand, ground water potential is very high, which causes water logging and soil salinity problem.

Sandy soils are distributed in the middle reach of Badaicha Distributary, which suggests possibility of improvement of surface drainage. Hydrological condition of the Area is illustrated in Fig. A.12.

(4) Purwa Study Area

Purwa Study Area was selected as representative area in view of "Salinity/alkalinity and waterlogging problem".

Characteristics of soil profile explain constraints of this Area. Thick heavy clayey layer exists up to 25m to 30m depth here which causes brisk capillary rise from shallow ground water table. Irrigation water supply proposed in Roster(Iin) is satisfied as a whole as shown in Table A.26 and Table A.27, but not on the sufficient level. Low permeability of soil causes water logging by the same amount of supplied water which does not bring about such a problem to high-permeable soils distributed in Sataon or Sursa Study Area.

Typical hydrological condition of Purwa Study Area is shown in Fig. A.13.

TABLES

Table A.1 List of Rainfall Data

District	Station	Contents	Available period
Pithoragarh	Pithoragarh	Monthly	1965-1989
-	-	Daily	1965-1982,1989
		Normal	
	Dharchula	Monthly	1979-1989
	Askote	Monthly	1965-1978
		Daily	1965-1978
	Chaukuri	Monthly	1965-1978
		Daily	1965-1978
Nainital	Haldwani	Normal	
Bareilly	Bareilly	Normal	
Pilibhit	Puranpur	Monthly	1965-1989
	r	Daily	1965-1989
	Pilibhit	Monthly	1965-1989
		Normal	
Shahjahanpur	Shahjahanpur	Monthly	1965-1989
	ohai	Daily	1965-1989
		Normal	1702 1707
Kheri	Kheri	Monthly	1965-1989
·	·	Daily	1965-1989
		Normal	1905 1909
Sitapur	Sitapur	Monthly	1965-1989
onapui	Sitapui	Daily	1965-1989
		Normal	1905-1909
Hardoi	Hardoi	Monthly	1965-1990
natuoi	Tialuoi	Daily	1905-1990
		Normal	
Barabanki	Nawah sani	the state of the s	1965-1989
рагарацкі	Nawabganj	Monthly	1965-1989
		Daily	1903-1989
I malemane	Landana	Normal	1045 1000
Lucknow	Lucknow	Monthly	1965-1990
	777	Normal	1065 1000
	Mohanlalganj	Monthly	1965-1990
		Daily	1965-1990
¥ ¥		Normal	1065 1000
Unnao	Unnao	Monthly	1965-1990
		Daily	1965-1990
×		Normal	
Rae Bareli	Rae Bareli	Monthly	1965-1990
		Daily	1965-1990
<u> </u>		Normal	
Pratapgarh	Pratapgarh	Normal	
Faizabad	Faizabad	Normal	
Sultanpur	Sultanpur	Normal	
Allahabad	Allahabad	Normal	

Source: Compiled Data by Board of Revenue, UP.

Table A.2 List of Meteorological Data

District St	ation	Data	Available period
Lucknow Li	icknow	Daily data for; Temperture Relative Humidity Wind speed wind direction Evaporation Sunshine hours	1986-1989
Hardoi H	ardoi	Daily data for; Temperture Relative Humidity Wind speed wind direction	1985-1989
Shahjahanpur Sh	ahjahanpur	Daily data for; Temperture Relative Humidity Wind speed wind direction	1985-1989
Kanpur K	anpur	Daily data for; Temperture Relative Humidity Wind speed wind direction	1986-1989

Source: India Meteorological Department, Lucknow

Table A.3 (1/4)

	Temperat	ure (C)		Relati	ve Humi	dity (%)				-
Month	max	min	mean	8:30 1/	17:30 2/	mean	W.S. 3/	ETpan 4/	ET0 5/	S.Hrs
Jan	22.6	: 7.8	15.2	85,2	59.2	72.2	1.4	1,6	2.5	7.
Feb	26.1	10.7	18.4	70.2	45.2	57.7	2.0	2,8	3.9	8.
Mar	32.0	11.7	21.9	59.6	32,9	46.3	2.7	5,0	5,6	8.
Apr	38.2	20.4	29.3	38.3	21.8	30.1	3.5	5,0	7.8	8.9
May	39.4	24.8	32.1	47.6	28.4	38.0	3.9	7.4	8.6	8.0
Jun	38.4	26.9	32.7	60.1	42.8	51.5	3.3	7.4	7.7	7.
Jul	33.7	26.3	30.0	. 83.9	73.3	78.6	2.5	3.7	4.8	4.
Aug	33.8	25.9	29.9	82.4	71.8	77.1	2.9	3.7	5.2	5.
Sep	33.6	24.6	29.1	82.6	71.8	77.2	2.1	3.5	4.6	5.
Oct	32.6	19.1	25.9	75.8	66,6	71.2	1.0	2.7	4.2	8.
Nov	29.4	12.7	21.1	73.8	63.0	68.4	0.6	1.9	3.0	8.
Dec	24.1	: . 9.0	16.6	86.8	68.4	77.6	0.9	1.5	2.0	6.
Annual	32.0	18.3	25.2	70.5	<i>5</i> 3.8	62.1	2.2	3.9	5.0	7.

Remarks:

- 1/ Measured at 8:30
- 2/ Measured at 17:30
- 3/ Wind speed in meter/sec
- 4/ Pan Evaporation in mm
- 5/ Evapotranspiration estimated by Modified Penman Method
- 6/ Sunshine hours in hours

Source:

Aquired from India Meteorological Department, UP

Table A.3 (2/4)

Climate of Shahjahanpur (1986 - 1989)

	Temperat	ure (C)		Relati	ve Humi	dity (%)			
Month	max	min	mean	8:30	17:30	mean	W.S.	Oktas	ET0
				1/	- 2/		3/	4/	5/
Jan	21.9	7.6	14.8	84.4	63.8	74.1	1.6	5.3	1.8
Feb	25.4	9.3	17.4	75.7	50.2	63.0	2.6	4.1	2.8
Mar	30.6	14.3	22.5	64.3	39.4	51.9	3.7	5.6	3.7
Арг	36.8	19.8	28.3	47.7	29.2	38.5	5.7	4.5	5.7
May	38.5	23.7	31.1	51.4	33.6	42.5	5.5	6.2	5.5
Jun	27.3	26.3	26.8	63.7	46.9	55.3	4.5	6.2	5.3
Jul	33.3	25.4	29.4	83.0	71.7	77.4	3.2	6.0	4.5
Aug	33.1	25.5	29.3	83.1	73.6	78.4	3.0	5.7	4.4
Sep	32.6	24.0	28.3	83.3	72.7	78.0	2.5	6.3	3.6
Oct	31.6	18.3	25.0	77.8	64.2	71.0	1.1	4.3	3.4
Nov	28.5	11.7	20.1	75.1	62.9	69.0	0.6	3.1	2.5
Dec	23.5	8.9	16.2	84.1	71.2	77.7	1.5	5.6	1.7
Annual	30.3	17.9	24.1	72.8	56.6	64.7	3.0	5.2	3.7

Remarks:

- 1/ Measured at 8:30
- 2/ Measured at 17:30
- 3/ Wind speed in meter/sec
- 4/ Oktas (Cloud cover expressed by 8 degrees. ex. full cover -> 8)
- 5/ Evapotranspiration estimated by Modified Penman Method

Source:

Aquired from India Meteorological Department, UP

Table A.3 (3/4)

	Temperati	ire (C)		Relati	ve Humi	dity (%)			
Month	max	min	mean	8:30 1/	17:30 2/	mean	W.S.	Oktas 4/	ET0 5/
Jan	21.4	8.6	15.0	86,0	63.3	74.7	0.2	3.6	1.9
Feb	25.1	11.5	18.3	79.9	54.9	67.4	0.3	4.3	2.8
Mar	31.0	15.4	23.2	67.1	39.8	53.5	0.4	2.3	4.2
Apr	37.3	21.8	29.6	44,1	30.2	37.2	0.5	3.2	5.7
May	38.8	25.2	32.0	51.4	32.6	42.0	0.4	4.0	6
Jun	37.9	27.4	32.7	60.0	44.7	52.4	0.4	4.0	6.4
Jul	33.6	26.0	29.8	81.9	71.2	76.6	0.4	4.8	5.1
Aug	33.5	26.2	29.9	82.7	72.5	7 7.6	0.4	4.4	4.9
Sep	33.2	25.2	29.2	80.9	68.8	74.9	0.3	4.6	4.3
Oct	32.3	20.3	26.3	75.0	59.9	67.5	0.1	3.0	3.6
Nov	28.7	13.8	21.3	74.7	54.3	64.5	0.1	3.7	2.9
Dec	22.9	9.8	16.4	86.3	63.5	74.9	0.1	3.2	1.8
Annual	31.3	19.3	25.3	72.5	54.6	63.6	0.3	3.8	4.

Remarks:

- 1/ Measured at 8:30
- 2/ Measured at 17:30
- 3/ Wind speed in meter/sec
- 4/ Oktas (Cloud cover expressed by 8 degrees. ex. full cover -> 8)
- 5/ Evapotranspiration estimated by Modified Penman Method

Source:

Aquired from India Meteorological Department, UP

Table A.3 (4/4)

Climate of Kanpur (1986 - 1989)

	Tempera	ture (C)		Relat	ve Humi	dity (%)			
Month	max	min	mean	8:30 1/	17:30 2/	mean	W.S. 31	Oktas 4/	ET0 5/
Jan	22.1	7.9	15.0	83.8	62.0	72.9	1.1	2.2	2.4
Feb	26.2	10.6	18.4	74.3	51.1	62.7	1.1	2.2	3.4
Маг	31.4	15.4	23.4	61.1	39.0	50.1	1.2	2.0	5.0
Apr	37.9	20.9	29.4	39.9	25.9	32.9	1.2	2.1	6.5
May	40.4	25.8	33.1	48.5	33.6	41.1	1.3	2.1	7.4
Jun	39.1	27.8	33.5	59.2	44.3	51.8	1.2	2.3	7.4
Jul	34.1	27.7	30.9	80.7	71.4	76.1	1.1	2.6	6.5
Aug	33.7	26.4	30.1	81.7	71.8	76.8	1.1	2.6	6.1
Sep	32.6	23.7	28.2	81.6	72.5	77.1	1.3	2.5	5.3
Oct	32.4	17.4	24.9	69.9	59.2	64.6	1.1	2.2	4.4
Nov	29.1	11.1	20.1	67.8	59.2	63.5	1.0	1.7	3.1
Dec	23.3	7.8	15.6	81.3	65.1	73.2	1.1	2.3	2.2
Annual	31.9	18.5	25.2	69.2	54.6	61.9	1.2	2.2	5.0

Remarks:

- 1/ Measured at 8:30
- 2/ Measured at 17:30
- 3/ Wind speed in meter/sec
- 4/ Oktas (Cloud cover expressed by 8 degrees. ex. full cover -> 8)
- 5/ Evapotranspiration estimated by Modified Penman Method

Source:

Aquired from India Meteorological Department, UP

Table A.4 Normal Rainfall in/around the Sharda Canal Command Area

	District		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Şçt	Nov	Dec	Annual
	Pithoragarh		44.2	66.1	23.9	29.2	51.8	188.9	319.4	287.6	173.7	38.6	8.6	23.6	
*	Namital		36.6	40.3	16.9	10.4	27.3	190.0	485.6	468.3	242.4	31.5	3.0	3.6	
*	Pilibhit		26.6	31.4	16.0	8.4	23.4	152.4	379.5	314.9	211.6	34.6	5.0	11.1	
*	Bareilly		26.3	30.5	13.9	8.6	19.1	125.4	326.3	312.0	196.0	34.1	4.0	10.4	
*	Shahjahanpur		16.5	22.2	11.9	8.1	17.2	119.7	300.0	284:0	127.0	41.0	3.6	8.2	
*	Khen		20.8	24.3	12.3	8.6	26.4	139.5	297.5	289.7	195.1	41.8	5.3	8.4	
*	Barabanki		15.9	20.6	7.9	5.7	14.3	98.4	299.7	281.6	203.6	43.6	47	6.5	
*	Sitapur	÷	17.8	19.9	6.6	8.7	15.6	108.5	285.1	267.7	188.5	40.9	3.9	7.5	
*	Hardoi		16.0	16.5	9.1	6.1	13.4	83.5	271.5	249.9	167.0	35.3	2.8	7.7	
×	Lucknow		16.2	18.5	%	7.7	13.9	86.8	295.4	271.8	194.5	34.6	5.2	6.3	
*	Unnao		13.8	16.7	7.7	9.9	9.7	67.8	262.1	247.3	165.1	30.3	4.8	5.9	
*	Rae Bareli		16.3	19.2	8.3	6.2	0.6	80.5	291.3	277.2	176.7	32.5	4.5	6.5	
	Pratapgarh		14.6	19.3	8.4	6.2	10.1	82.2	303.6	298.0	184.9	38.6	5.1	6.9	
	Faizabad		13.5	19.2	8.1	6.5	14.2	106.5	306.1	282.0	196.7	46.7	4.6	5.5	
	Sultanpur		14.7	18.7	7.3	7.0	10.7	27.3	307.1	289.7	202.8	4.4	4.0	6.5	
	Allahabad		17.2	19.8	8.2	5.4	8.0	80.7	303.4	300.2	181.1	38.6	7.1	6.7	976.4
*	Average		20.3	23.6	11.1	7.7	17.2	113.9	317.6	296.8	188.0	36.4	43	7.5	
	-		} !	1	^	‡	-	941.2 Kharif	90.1%		^		103.1 Rabi	9.6%	
	Average		20.4	25.2	11.1	8.7	17.8	108.6	314.6	295.1	187.9	37.9	4. 8.	8.2	1040.5
		ļ	1		Ý		-	932.7	- %9.68		V		107.8 Pahi	10.4%	

Remarks: * ; Station located in the Sharda Canal Command Area

Source; Board of Revenue, UP

Table A.5 Probability of Rainfall in the Past (1/5)

			Station	Station: Pilibhit							Station	Station: Kheri			
Kharif				Rabi				Kharif				Rabi			
Year	Discharge (MCM)	Wet Year (year)	Dry Year (year)	Year	Discharge	Wet Year (year)	Dry Year (year)	Year	Discharge	Wet Year (vear)	Dry Year (vear)	Year	Discharge	Wet Year	Dry Year (vear)
1960				1960/61	K Z			286. 1986.	AZ			1960/61	A.Y.		
1861	Y Z			1961/62	A.N			1821	Ϋ́Z			1961/62	N.A		
1962	N.A			1962/63				1962	Y'Z			1962/63	N.A		
1963	N.A.			1963/64				1963	A.Z.			1963/64	K.Z		
1964	N.A			1964/65	~			2 4 8 1	K Z			1964/65	A.		
1965	996		31.2				5.9	1965	609		7.7	1965/66	128	потпа	
1966				1966/67				1966	714		43	1966/67	74	normal	
1967		normal		1967/68	1	normal		1967	108	normal		1967/68	9		
1968	1,676	7.1		1968/69		lemon		1968	1,239			1968/69	22		
1969	1,465	normal		1969/70	117	normal		1969	1381	5.3		1969/70	74		
1970		normal		15/0/11	116	решои		1970	855	normal		17/0/21	126	normal	
1971	1,766	16.7		1971/72	228	7.1		1971	1,610	9.1		1971/72	153	4.5	
1972	765	normal		1972/73	63	lamon		1972	806	normal		1972/73	53		4.0
1973	1,473	4.0		1973/74	247	8.3		1973	1,299	4.0		1973/74	221	10.0	
1974	N.A.			1974/75	N.A			1974				1974/75	Y.Z		
1975	N.A.			1975/76	25		8.0	1975	A.Z.			1975/76	Ϋ́Z		
1976	1.634	6.7		1976/77	N.A			1976		normal		1976/77	A.X		
1977				1977/78	N.A			1977	700		4.8	ـــا	178	6.7	
1978	1,036	normal		1978/79	NA			1978	1.0	lamon.	, a	1978/79	120	normal	
1979			5.9	Щ		normal		1979			100	لبيا		normal	
1980		normal			38		4.2	0861	1	11.1		1980/81	2/2	normal	
1881			25.0	1981/82		normai		1981	N.A			1981/82	Į.		
1982			4.0		NA			1982	1,195	поппа		1982/83	72	normal	
1983	1,711	11.1		1983/84	n	18.2		1983	· .	19		1983/84		25.0	
1984	1,046	normal		1984/85			19.2	1984	696	normal		1984/85			11.1
1985		normal	2	1985/86	2	11.9		1985		normal		1985/86	179	6.3	
1986	1	5.3		1986/87	78	normai		1986		rous		1986/87	83	normal	1 2 3 3 3
1987	11.0		4.3				4.5	1987	424		40.0	1987/88	57	normal	
1988	1,198	normal		1988/89	105	normal	.:	1988	1,300	4.0		1988/89	53		4.0
1989	161.1	normal		1989/90				1989	1,341	4.5		1989/50			100
1990								1990							
Average	1,132			Average	112			Average	1,033			Average	108		

Total discharge was calculated based upon weekly discharge observed by Irrigation Department of UP.

The season whose return period of rainfall is less than four years was regarded as normal. Remarks:

Table A.5 Probability of Rainfall in the Past (2/5)

Static	on: Shal	Station: Shahjahanpur Rabi				Kharif			Station	Station: Sitapur			
Dry Year		Year	Discharge	Wet Year	Dry Year.	Year	Discharge	Wet Year	Dry Year	Year	Discharge	Wet Year	Dry Year
(vear)	J	1	MCM	(year)	(year)		(MCM)	(year)	(year)		(MCM)	(year)	(year)
21	뛰	1960/61	AN			1960	N.A.			1960/61	N.A		
6]	의	1961/62	AN			1961	N.A			1961/62	N.A		
19	5	1962/63	N.A.			1962	N.A			1962/63	N.A		
13	의	1963/64	Y.Y			1963	N.A			1963/64	N.A		
19	13	1964/65	Y Z			1964	N.A		-	1964/65	A.A		
5.9 19	19	99/59	73	normal		1965	659		9.1	1965/66	117	4.0	
19	55	1966/67	N.A			1966	699		7.5	1966/67	45	normal	
15	15	89/29	65	normal		1961	821	normal		1967/68	41	normal	e e
15	15	1968/69	27		4.8	1968	1,187	norma		1968/69	19		5.6
15	15	1969/70	127	normal		1969	974	поппа		1969/70	82	nomai	-
19	19	70/71	28	normal		1970	1,132	normal		1570/71	Y'A		
19	19	71/72	162	normal		1971	1,655	15.4		1971/72	167	6.3	
25.0 19	5	2773	17		8.2	1972	712		63	1972/73	57	normal	
19	19	73/74	191	7,7		1973	888	normal		1973/74	747	11.1	
19	ž	1974/75	A.N.			1974	A.N			1974/75	Ϋ́Z		
19	19	1975/76	51	normal		1975	Ϋ́Υ			1975/76	91		7.1
197	197	1976/77	N.A			1976	823	normal		1976/77	A.N.		
19	19	1977/78	116	normal		1977		normal		1977/78	N.A.		
19	15	1978/79	70	normai		1978	1,026	normal		1978/79	Y'N		
5.3 15	15	1979/80	A.V.			1979	A Z			1979/80	LZ	peunou	
15	ř	1980/81	55	normal		1980	1,830	28.6		1980/81	31		4.8
1	ĭ	1981/82	139	normal		1981	1,237	normal		1981/82	A.Z.		
-	-1	1982/83	Y.			1982	Ϋ́			1982/83	N.A		
1	~ I	1983/84	<u>2</u>	5.3		1983	A.N			1983/84	N.A		
T	Η.	1984/85	11		14.3	1981	A.Z.			1984/85	Y'A		
1		1985/86	270	22.2		1985	Y Z			1985/86	YZ		
1	-	1986/87	8		20.0	1986	A.N.			1986/87	Y'N		
14.3	-	1987/88	41	normal		1987				1987/88	Y Z		
		1988/89	149	4.2		1988	ď Z			1988/89	Y.Z		
1	~	06/6861				1989				1989/90			
	١.		 			1990							
Ave	ve	Average	96			Average	1,043			Average	77		

Remarks. Total discharge was calculated based upon weekly discharge observed by Irrigation Department of U.P. The season whose return period of rainfall is less than 4 year was regarded as normal.

Table A.5 Probability of Rainfall in the Past (3/5)

			Station: Hardoi	Hardoi						Static	Station: Mohanlalganj(Lucknow)	alganj(Lu	cknow)		
Kharif				Rabi				Kharif				Rabi			
Year	Discharge	Wet Year	Dry Year	Year	Discharge	Wet Year	Dry Year	Year	Discharge	Wet Year	Dry Year	Year	Discharge	Wet Year	Dry Year
	(MCM)	(year)	(year)		(MCM)	(year)	(year)		S	(year)	(year)		(MCM)	(year)	(year)
1960	NA			19/09/61	NA			8				1960/61	N.A.		
1961	N.A			1961/62	AN			1861				1961/62			
1962	N.A			1962/63	Z Z			1962				1962/63			
1963	AZ			1963/64	A.Z	<u> </u>		1963	·			1963/64	N.A		
188	AZ			1964/65	A'Z			1981 282				1964/65	NA		
1965	330	normal		1965/66	39	normai		1965			1.6	<u> </u>	39	normal	
1966		normal		1966/67	39	normal		1966	009	normal		1966/67			
1967	299	normal		1967/68	19	normai		1967		4.0		1967/68			
1968	868	normal		1968/69	11		37.0	1968		normal	75,	1968/69			17.5
1969	852	nomal		1969/70	255	12.5		1969	77.1	normal		1969/70		4.0	
1970	Ϋ́Z			1570/71	65	normal		1970	7	9.1		15/0/21	52	normal	
1971	783	normal		1971/72	35		4.3	1971		normal		1971/72		normal	
1972	423		5.9	1972/73	25		7.6	1972	NA			1972/73	23		6.7
1973	325		14.3	1973/74	175	6.3		1973		normal		1973/74			63
1974	A.Z.			1974/75	AZ			1974				197475	AN		
1975	Y.Z			197/2/76	31		5.0	1975	N.A			1975/76	AN		
1976	832	normal		1976/77	Α̈́			1976	N.A			1976777	N.A		
1977	1.204	7.7		1977/78	199	7.4		1977	N.A			1977/78		normal	
1978	1,267	12.5		1978/79	81	normal		1978	1,063	5.6		1978/79	85	١.	
1979	369		9.1	1979/80	52	normal		1979			83		040	normal	
0861	1,364	22.2		1980/81	62	normal		1980	1,386	16.7		1980/81		normal	
1881	843	Ĕ		1981/82		normal		1981		normal		1981/82		1.7	
1982	724	nomal		1982/88		normal		1982		normal		1982/83	S	normal	
1983	414		6.7	1983/84	128	4.0		88	694	normal		1983/84		normal	
1984	496	nomal		1984/85	13		25.0	1984		normal		1984/85		100	
1985	1,023	5.7		1985/86	312	normal		1985	5 951	4.3		1985/86		58.8	
1986	594	normal		188981	58	normal		1986		normal		1986/87		normal	
1987	<u>¥</u>		11.8	1987/88	92	normal		1987			16,9	1987/88		4.0	
1988	668	4.5		1988/89	108	normal		1988	ľ,	normal		1988/89	4	8.4	
1989	622	normal		1989/90				1989		norma		1989/90			
1990								1990							
Average	734			Average	8			Average	758			Average	70		

Remarks: Total discharge was calculated based upon weekly discharge observed by Irrigation Department of UP.

The season whose return period of rainfall is less than four years was regarded as normal.

Table A.5 Probability of Rainfall in the Past (4/5)

		Dry Year (year)									17.5							14.3			6.3									6.7			
		Wet Year (year)						normal		normai		normal	normal	normal	normal	7.7				normai		normal	normal		normal	8.4	normal	28.8	4.0		normal		
		Discharge (MCM)	Ą.	A.N.	A.N	Ą.X	A.N	72	A.A	111	14	22	51	118	26	157	N.A	17	N.A	91	52	101	90	N.A	41	178	78	244	132	24	70		
ae Barel	Rabi	Year	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67	1967/68	1968/69	1969/70	1970/71	1971/72	_	1973/74	1974/75	1975/76	1976/77	1977/78		<u> </u>	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	لبيبا	لببا	1988/89	1989/90	
Station: Rae Barell		Dry Year (year)						7.9							6.3					9.0		6.7								66.7			
		Wet Year (year)								normal	normal	normal	4.0	6.3		7.7			normal	normal	4.2	normal	25.0	normal		normal	normal	normal	normal		normal	normal	
		Discharge (MCM)	A.N	N.A	A.N	A.S	A.N	357	N.A	1,051	767	1,050	1,149	1,285	624	1,368	N.A.	A.N.	747	343	1,152	410	1.777	851	A.A	1,118	795	1,105	626	66	704	720	_
	Kharif		1960	1961	1962	1963	1964	1965	9961	1967	1968	1969	1970	1971	1972	1973	1974	1975.	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	500
į		Dry Year (year)							6.3		285.7		4 8			9.5											5.6						
:		Wet Year (year)			-			6.3		normal		normal		normal	normal		-	потта		normal					normal	6.7			normal	4.3	погта		-
		Discharge (MCM)	Ϋ́Z	A'N	₹ Z.	Z	ΥZ	146	33	26	10	102	38	7.6	SS	27	ΑN	71	Ϋ́Z	83	ĄZ	Y Z	₹ 2	A	79	149	36	N.A.	53	123	57		
Unnao	Rabi		1960/61	1961/62	1962/63	1963/64	1964/65	1965/66	1966/67	1967/68	1968/69	1969/70	12/0/51	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1982/86	18/9861	1987/88	1988/89	1989/90	
Station: Unnao		Dry Year (year)						5.0											4.0			6.7								18.2		10.0	
		Wet Year (year)				-				normal	normal	normal	normal	7.1	normal	normal				normal		1			20.0	10.0	normal	4.2	normai		normal		
٠		Discharge (MCM)	Ϋ́Z	AN	N.A.	Y.Z.	ΥZ	548	N.A	738	778	959	887	1,071	760	724	N.A.	N.A.	582	746	Ϋ́	498	A.Z.	N.A	1,286	1,137	727	917	793	419	808	473	
	Kharif	Year	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1000

Remarks: Total discharge was calculated based upon weekly discharge observed by Irrigation Department of UP.

The season whose return period of rainfall is less than four years was regarded as normal.

Table A.5 Probability of Rainfall in the Past (5/5)

Station: Barabanki

Year	Discharge	Wet Year (year)	Dry Year (vear)	Year	Discharge	Wet Year	Dry Year (vear)
1960	Z			19/09/61	ſ		
1961	AN			1961/62	N.A		
1962	A.Z.			1962/63	AN		
1963	NA			1963/64	A.Z.		
1961	N.A			1964/65			
1965	399		7.7	1965/66		norma	
1966	A.N.			1966/67	Ϋ́Z		
1967	266	normal		1967/68	73	normal	
1968	465		5.3	1968/69	Ä		
1969	945	normal		1969/70	76	normal	
1970	1,390	5.0		16/0/61	95	normai	
1971	N.A			1971/72	75		
1972	465		5.3	1972/73	61	normal	
1973	1,033	normal		1973/74	125	6.7	
1974	A.N.			1974/75	A.N		
1975	N.A			1975/76	23		14.3
1976	A.Z.			1219177	N.A		
1977	751	normai		1977/78	162	12.5	
1978	1	normal		1978/79	104	4.5	
1979	455		5.6	1979/80	28		7.7
1980	1.915	11.1		1980/81	84	normal	
1981	1,183	normal		1981/82	AZ		
1982	AN			1982/83	7.1	normal	
1983	NA			1983/84	ĄZ		
1984	NA			1984/85	AZ		
1985	N.A			1985/86	A'N		
1986	A.A			1986/87	A.N.		
1987	A.N.			1987/88	A.Z		
1988	N.A			1988/89	N.A		
1989	A.Z	-		1989/90	N.A		
1990							-

Total discharge was calculated based upon weekly discharge observed by Impation Department of UP.

The season whose return period of rainfall is less than four years was regarded as normal. Remarks:

Table A.6 Dependable Annual Rainfall by District

unit: mm

Station		Kharif			Rabi	
	90%	80%	75%	90%	80%	75%
Pilibhit	520	680	. 780	22	34	40
Shahjahanpur	550	640	680	14	26	32
Kheri	560	680	740	33	46	52
Hardoi	360	460	500	21	32	-36
Sitapur	640	740	780	13	21	25
Barabanki	360	470	<i>5</i> 30	25	34	38
Lucknow	380	460	500	19	27	31
Unnao	470	550	580	27	38	43
Rae Bareli	300	520	640	18	32	39

Source: Board of Revenue, UP

Drought Year by District Table A.7

	1965	-	1966		1967	-	8961	_	696	-	1970	19	71	1972	2	1973		1974		1975	-	916	15	L
	¥	2	X	Z Z	X	2	X	24	저	×	1	R	R	4	R	Y	æ	M	22	거	2	×	R x	KR
Sharda River	0	0		0			-	0	 -	\vdash	-	-	-	-	_			0			-	ļ	-	ļ
Pilibhit	0	0						-	 	-	-				_					-	-		0	-
Kheri	0		0				-		-	-	-	-	<u> </u>	 	0								0	
Shahjahanpur	0			 				0		-		_	_	0	0									
Hardoi								<u> </u>	-	-	-	_	0	0	0	0					0		7	
Sitapur	0		0			-	-	0		-		-	<u> </u>	0							0			
Barabanki	0				 	-	0	-		_	-	-	-	0							0			
Lucknow	0					-		0	-	-	_		<u> </u>	_	0		0							
Unnao	0			0	 			0	-	<u> </u>	ľ		_		_		0					0	 	
RaeBareli	0							0		-	_	-		\bigcirc					 		() ())	

	1978		1979		1980		1981	<u> </u>	1982	1	1983	15	1984	1985	S	1986	2	1987		1588		1989
	X	R	K	R	¥	æ	¥	×	Y	R	K	R X	KR	X	~	A	R		R	K	œ	¥
Sharda River				0	0				Ť	0	0	-	-		_			0	0			\circ
Pilibhit			0			0	0	<u> </u>	0			_	(6			<u> </u>	0	0			
Kheri			0				-	<u> </u>		_		_	\mathbb{P}		_	L		0			0	
Shahjahanpur	1		0						-	-	_	<u> </u>	(_		0	0				
Hardoi			0							-	-		0		_		_	0				
Sitapur						0		-		-			_	_	_							
Barabanki			0	0					-	-		_		_			_					
ucknow		-	0						-	-	-		_	-	-			0				
Unnao			0							-	-		0					0				0
RaeBareli		Ç	C						-	-	_	_	_	_	L	_	_	0	C			

Drought of once in 4 to 10 years
Drought of less than once in 10 years
K: Kharif
Rabi

Table A.8 Probability of Discharge of the Sharda River

Kharif				Rabi			
Year	Discharge (MCM)	Wet Year (year)	Dry Year (year)	Year	Discharge (MCM)	Wet Year (year)	Dry Year (year)
1960	13,139	normal		1960/61	4,149	5.3	
1961	16,687	14.3		1961/62	5,126	10.5	
1962	16,084	9.1		1962/63	3,741	normal	
1963	12,891	normal		1963/64	3,397	normal	
1964	14,829	4.5		1964/65	3,823	normal	
1965	8,996		50.0	1965/66	2,469		33.3
1966	13,314	normal		1966/67	2,610		15.4
1967	13,895	normal		1967/68	3,196	normal	
1968	14,192	normal		1968/69	3,028		4.0
1969	11,971	normal		1969/70	3,654	normal	
1970	11,762	normal		1970/71	3,164	normal	
1971	17,861	33.3		1971/72	4,346	6.3	
1972	11,873	normal		1972/73	3,468	normal	
1973	15,959	8.3		1973/74	4,470	6.7	
1974	10,791		7.7	1974/75	5,211	11.8	
1975	16,796	16.7		1975/76	3,596	normal	
1976	14,729	4.0		1976/77	3,044	normal	
1977	13,179	normal		1977/78	3,407	normal	
1978	12,098	normal		1978/79	3,576	normal	
1979	12,781	normal		1979/80	2,680		10.5
1980	11,424		4.8	1980/81	3,601	normal	
1981	14,516	normal		1981/82	3,270	normal	
1982	13,346	normal		1982/83	3,013		4.2
1983	11,607		4.5	1983/84	4,053	4.8	
1984	13,497	normal		1984/85	2,933	normal	
1985	12,902	normai		1985/86	6,988	43.5	
1986	13,708	normal		1986/87	3,516	normal	
1987	9,430		33.3	1987/88	2,684		10.0
1988	15,817	7.7		1988/89	3,255	normal	
1989	10,911		7.1	1989/90	3,355	normal	
1990	13,641	normal					
Average	13,375			Average	3,627		

Remarks: Total discharge was calculated based upon weekly discharge observed by Irrigation Department of UP.

The season whose return period of discharge is less than four years was regarded as normal.

Table A.9 Estimation of Low Flow and Flood of the Sai River

unit : cumce

Station		بكتيد المحكوني بيونيس بيوني	Auras (CA	=1,950sa.	km)			Sarojini Nagar	Sataon	Rae Bareli
Year		1985	1986	1987	1988	1989	1990	(CA=4,030 sq.km)	(CA=5,080 sq.km)	(CA=6,201 sq.km)
January	Ave		5.1	4.8	2.0	1.4	1.5			
June 19	Max		8.5	6.0	2.0	1.6	1.7	17.6	22.1	
	Min		3.8	4.0	1.9	1.3	1.4	3.2	4.2	5.2
February	Ave		4.3	3.9	2.0	1.4	1.4			
100.0)	Max		5.6	4,0	2.1	1.4	1.4	11.6	14.6	
	Min		3.0	3.7	1.5	1.4	1.4	3.0	3.8	4.7
March	Ave		2.9	3.4	2.0	1.8	1.5			
	Max		3.1	3.5	2.2	2.6	1.9	7.2	9.1	
	Min		2.7	3.2	1.9	1.3	1.4	2.3	2.8	3.3
Ápril	Ave		2,7	2.8	2.1	1.4	2.3			
	Max		2.9	3.2	2.2	1.5	3.0	6.5	8.3	
	Min		2.0	2.5	1.9	1.3	1.9	1.9	2.3	2.6
May	Ave		1.9	2.3	1.9	1.5	2.3			
	Max	3	2.0	2.6	2.0	1.9	2.9	6.0	7.6	
	Min		1.8	2.0	1.8	1.3	1.8	2.0	2.3	2.7
June	Ave		2.3	2.0	2.2	2.0	2.7			
	Max		6.5	2.6	2.8	2.1	3.1	13.4	16.9	
	Min		0.5	1.9	1.8	1.9	0.7	2.1	2.9	3.8
July	Ave		29.5	1.9	9.7	4.2	3.8			
	Max		64.0	2.1	20.3	4.9	5.8	132.3	166.7	
	Min		8.1	1.6	2.1	3.6	1.9	13.7	19.9	26.4
August	Ave	28.4	20.0	1.8	21.7	3.1	3.8			
	Max	35.0	29.2	2.0	22.9	3.7	5.6	60.3	76.1	
	Min	25.8	11.8	1.7	20.4	2.9	1.9	17.4	25.3	33.8
Septembe	Ave	88.2	14.9	2.0	20.6	3.3				
•	Max	158.6	119.3	2.2	23.5	3.5		327.8	413.2	
	Min	24.0	7.4	1.7	16.4	3.0		21.1	30.9	41.3
October	Ave	105.6	7.8	2.4	15.2	2.9				
	Max	182.2	8.7	4.3	19.8	4.2		376.4	474.5	
	Min	38.7	7.4	1.1	7.4	2.2		10.9	15.9	21.2
Novembe	Ave	22.9	4.3	1.8	6.9	2.0		<u> </u>		
	Max	50.5	4.8	2.0	7.6	6.1		104.4	131.6	
	Min	8.3	4.0	1.8	4.3	1.0		4.3	5.9	7.7
December	Ave	10.8	5.1	1.9	3.8	1.9	***************************************			
	Max	14.5	6.0	2.1	4.1	1.9		30.0	37.8	
	Min	6.3	4.3	1.8	1.6	1.8		3.6	4.6	5.7

Remarks: ¶1 Minimum Values for Sarojini Nagar and Sataon are interpolated from those of Auras and Rae Bareli. by catchment area.

^{§2} Maximum Values for Sarojini Nagar and Sataon are extrapolated from Auras by catchment area.

⁹³ Values for Rae Bareli are 75% dependable dischrage reported in "Hydrological Report of Sai River" (1983) by Irrigation Department of UP.

J4 Outlined values are the maximum during period of measurement.

⁹⁵ Bold-faced values are the minimum during period of measurement.

Table A.10 Water Quality in the Sharda Irrigation System

Point of Measurement	Date	EC (mmho)	pН
Sharda River	20/10/90	0.185	8.5
Main Canal (BP)	20/10/90	0.230	8.5
Main Canal (EP)	20/10/90	0.240	8.3
Outlet from Sagar Dam	21/10/90	0.240	8.3
Hardoi Branch (BP)	21/10/90	0.230	8.4
Hardoi Branch (56mile)	07/02/91	0.380	8.6
Hardoi Branch (70mile)	07/02/91	0.310	8.7
Hardoi Branch (99mile)	21/10/90	0.240	8.4
do	07/02/91	0.310	8.6
Hardoi Branch (EP)	22/10/90	0.240	8.4
Lucknow Branch (BP)	21/10/90	0.240	8.5
Lucknow Branch (Lucknow)	22/10/90	0.260	7.8
Unnao Branch (Unnao)	22/10/90	0.250	8.3
Unnao Branch (near EP)	22/10/90	0.250	8.5
Purwa Branch (Unnao)	22/10/90	0.240	8.4
Purwa Branch (near EP)	22/10/90	0.240	8.6
Average		0.255	8.4

Remarks: Results of field measurement

Table A.11 Comparison of Roster and Actual Discharge of the Main Canal System

			1990 Kharif		1989/90 Rabi		1989 Kharif	11	1988/89 Rabi		1988 Kharif		1987/88 Rabi		1987 Kharif		1986/87 Rabi		1986 Kharif	
			Roster	Actuai	Roster /	Actual R	Roster	Actual R	Roster A	Actual R	Roster A	Actual R	Roster /	Actual	Roster	Actual R	Roster A	Actual	Roster /	Actual
	1	Sharda River	14,497	15,976	2,855	3,292	14,599	12,226	(2,855)	3,219	(14,548)	17,057	(2,855)	2,663	(14,548)	11,553	(2,855)	3,537	(14,548)	16,611
	2	Nepal Channel	104	*06	64	N.A.	96	N.A.	<u>(</u> 2)	*67	(100)	NA	<u>\$</u>	N.A.	(100)	*72	<u>§</u>	N.A.	(100)	A'A
	æ	Sharda Main Canal	4,535	3,993	2,774	3,010	4,346	4,154	(2,774)	2,986	(4,441)	4,545	(2,774)	2,599	(4,441)	4.597	(2,774)	3,358	(4.41)	4399
	4	Khatima Channel	31	11*	15	N.A.	50	N.A.	(15)	N.A.	(30)	N.A.	(15)	N.A.	(30)	24*	(15)	N.A.	(G)	Z.
	S	New Sharda Sagar Feeder	233	249	96	147	301	286	(96)	118	(267)	222	(96)	*2	(267)	270 *	(96)	102	(267)	201
_	9	Old Sharda Deoha Feeder	315	164*	96	N.A.	260	N.A.	(96)	85	(288)	N.A.	(96)	N.A.	(288)	286*	(96)	N.A.	<u>@</u>	N.A.
	7	Nagra Escape	0	413*	0	236	0	4	0	288	9	318	(0)	Z.A.	(O)	3*	(O)	395	<u>e</u>	\$4
	8	New Sharda Deoha Feeder	472	209	268	268	452	366	(368)	301	(462)	525	(398)	246	(462)	487*	(392)	320	(462)	358*
ļ. 	6	Bisalpur Branch	114	103	62	90	110	102	(29)	99	(112)	35	(62)	*	(112)	128*	(62)	S	(112)	128
•	10	Nigohi Branch	163	110*	7.6	100	1 <u>5</u> 2	142	(22)	12	(1.59)	132	(6)	81*	(129)	128*	(26)	.8	(159)	153
	11	Loss up to Bifurcation	185	199*	171	N.A.	164	N.A.	(171)	N.A.	(175)	N.A.	(171)	N.A.	(175)	-377	(171)	N.A.	(37.5)	N.A.
1	12	Bifurcation	3,022	2,535*	1,964	2,045	2,887	2,616	(1.964)	1,928	(2,955)	3,116	(1,964)	2,055*	(2,955)	2,959	(1,964)	2,174*	(2.955)	2,855
	13	Old Sharda Sagar Feeder	390	259*	305	432	322	238	(305)	41.5	(356)	514	(305)	401	(356)	297	(305)	7.17	(356)	364
A	14	Kheri Branch	966	*726	270	517	1,017	919	(025)	602	(1,007)	942	(025)	647*	(1,007)	585	(0.25)	133*	(1.007)	8
	1.5	Hardoi Branch Head	1,636	1349	1,089	1,096	1,548	1,459	(1,089)	911	(1.592)	1,660	(1,089)	1,007	(1,592)	1.677	(1,089)	1.96	(1.592)	1.547
41	F	ii Outlet Channel from S.S. Dam	576	*692		473	648	694	(401)	099	(612)	784	(401)	481*	(612)	689	(401)	±902	(612)	\$69
	Ë	ii + ii	2,212	2,118*	1,490	1,569	2,196	2,153	(1,490)	1,571	(2,204)	2,444	(1,490)	1.488*	(2,204)	2,366	(1,490)	1,673*	(2,204)	2242
	-	iv Madhotanda Dy	85	27		23	95	46	(31)	29	(22)	45	(31)	73*	(57)	4	(10)	Ň.A.	(57)	33*
	_	v Loss up to 13.4 mile	111	**	85	52	53	117	(85)	1.1	(65)	278	(88)	217*	(69)	169	(85)	N.A.	(65)	315*
		vi 13.4 mile	2,076	2,037	1,401	1,517	2,086	1,990	(1,401)	1,465	(2,081)	2,121	(1.401)	1,248	(2,081)	2,153	(1,401)	1,466	(2,081)	1,893
	Ŋ	vii Loss 13.4 - 53 mile	334	405	265	296	242	439	(265)	298	(288)	387	(265)	222	(388)	320	(265)	138	(288)	211
	Vi	viii[53 mile	1,741	1,632	1,136	1,221	1,844	1.551	(1,136)	1,167	(1,793)	1,734	(1,136)	1,026	(1,793)	1,803	(1,136)	1,328	(1,793)	1,682
	-	ix Shahbad Dy	73	N.A.	48	N.A.	8	N.A.	(48)	N.A.	3 8	N.A.	(48)	N.A.	(84)	N.A.	(48)	N.A.	(84)	N.A.
F 4	16	Increased Volume of S.S. Dam	47	-261	0	106	-25	-170	(0)	-127	(11)	48	(0)	12	(11)	-122	(0)	4	(11)	-130
1	17	i Average Volume in S.S. Dam	82	336*	143	346	59	206	(143)	351	(1)	218	(143)	269*	(71)	225	(143)	257*	(11)	239
	F	ii Max Volume in S.S.Dam	135	323*	1.1.2	353	169	221	(777)	361	(1.52)	225	(777)	343*	(152)	235	(22)		(152)	270
	i.	iii Min Volume in S.S.Dam	56	242*	4	168	4	127	(4)	166	(30)	150	Ð	129*	(30)	137	(4)	130*	(30)	128
1	18	Average W.L. of S.S. Dam (m)	609.3	616.5*	611.9	617.4	97.09	609.2	(611.9)	617.4	(608.4)	610.6	(611.9)	612.9*	(608.4)	610.2	(611.9)	615.3*	(608.4)	610.9
	Н	ii Max W.L. of S.S.Dam (m)	612.5	620.0*		622.0	613.3	613.0	(621.1)	622.5	(612.9)	613.3	(621.1)	621.3*	(612.9)	614.0	(621.1)		(612.9)	616.0
	, n	iii Min W.L. of S.S.Dam (m)	607.6	614.3*	603.3	609.1	603.4	605.4	(603.3)	0.609	(605.9)	607.6	(603.3)	£05.6*	(605.5)	606.4	(603.3)	605.7*	(605.5)	605.5
														:						

Remarks: Parenthesized values are average of discharge mentioned in available Roster.

Values with (*) are averaged or modified values of available data

Table A.12 Weekly Comparison of Actual & Roster Discharge - 1990 Kharif (1/8)

	R:	I.Sharda Kiver	iver					2.Nepa	Nepal Channel					3.Shard	3.Sharda Main Cana	na.			
	Peri	odical Di	Periodical Discharge (cusec)		Accumulated Discharge (MCM)	d Discharg	e (MCM)	Periodic	Periodical Discharge (cusec)	(casec)	Accumulate	Accumulated Discharge (MCM)	(MCM)	Periodica	Periodical Discharge (cusec)	cusec)	Accumulate	Accumulated Discharge (MCM)	(MCM)
Period	od Actual		Roster	7	Actual	Roster		Actual	Roster		Actual	Roster		Actual	Roster		Actual	Roster	
		(1)	3	(1)/(2)	(3)	(5)	(3)/(4)	3	3	(1)/(2)	3	£	(3)/(4)	Ξ	3	(1)/(2)	3	4	(3)/(4)
03/29/90	06/	6.736	4,500	150%	115	17		z	A. 150	A.Z.			Z.A.	6493		149%			149%
04/03/90	06/	5,926	2,000	119%	217				0 150			S	Z	5,90				٠.	135%
04/12/90	06/	6:039	5,500	110%	320		125%			%0 o	N.A.	80	N.A.	6.01					127%
04/19/90	06/	5,862	6,000	%%	420		117%				N.A.	10	N.A.	6,613	3 5,850			l	123%
04/26/90	06/	6,265	6,500	%96	228				0 150		ĄZ	13	Z	624					117%
06/60/50	_	6,286	7,000	90%	635	250	L			%0 0		1.5	N.A.	6,981		102%	655	575	114%
05/10/90	_	13,735	8,000	172%	870		120%					180	N.A.	5,661	L				106%
05/17/90	_	16,080	000'6	179%	1,146	88	130%			71%	Ä.Ä.	22	Ä	10,117	7 8,750				108%
L.		14,388	10,000	14%	1,392	1,053	132%	7		0 115%		27	N.A.	10,252					107%
08/18/50	_	17,523	10,500	167%	1,692	1,232		Ř			N.A.	31	Z.A.	10,655	١.		5 1,283		107%
L		13,916	11,000	127%	1,930			m'			Z.A.	35	Z.A.	11,00	: '		i		106%
		12,709	12,000	106%	2,147		132%	ň			N.A.	39	Y Z	11,004					105%
06/21/90		20,505	15,000	137%	2,498			7	276 250	0 110%		4	N.A.	10,574		%256	1,840		103%
06/28/30		28,739	27,000	106%	2,990			3.				84	N.A.	9,443					101%
06/50//0	-	80,628	40,000	227%	4.541			2.		0 91%		52	Z.A.	6,12		ŀ			97%
04/17/20	ļ	74,574	45,000	166%	5,818		153%	3					Z A	1.507	۱.				90%
04/17/0		55,617	00009	93%	6,770			ř.					N.A.	9,042					89%
04/32/20	_	59,176	70,000	85%	7,783			Z,	A. 250	N.A.		65	Z	10,185		%58	ŀ	:	%68
08/05/30	_	55,497	80,000	%69	8,733		118%	z L				69	ĄZ	10,534				2,960	89%
06/60/80	-	88,528	80,000	111%	10,248			z			Ä	4	Z.A.	10,53		ŀ			%68 %
08/16/90	<u> </u>	84,700	80,000	106%	11,697		115%	Z			N.A.	28/	Y Z	10,534	4 11,500		3,003	3,354	260%
08/23/30	L	55,469	70,000	266	12,647		112%	z _			A.A.	82	Z.A.	10,668					80%
06/06/80	-	54,370	000,09	91%	13,577		110%	z				98	N.A.	10,534	ŀ				%06
06/90/60	_	50,270	20,000	101%	14,438	13,213	109%	2		i	N.A.	16	Z.A.	10,88	3 11,500				%06
06/13/50	_	42,243	30,000	141%	15,161	13,727	110%	Ñ		0 106%	N.A.	56	Z.A.	11,273					2006
06/20/50		37,758	25,000	151%	15,807	14,155	112%	Ñ		0 106%	N.A.	66	Y.	10,023	3 11,500		3,916	4338	3%06 30%
09/22/90	-	38,463	20,000	192%	16,465	14,497	114%	E)		0 141%	N.A.	104	N.A.	14,453	3 11,500	126%	4,164	4.535	92%
Average		35 630	31370	114%				∀ 2	227	7. A.				10.6					
Maximum		90,628	80,000	113%				Z V	250					14,453	3 11,500	126%			

Table A.12 Weekly Comparison of Actual & Roster Discharge - 1990 Kharif (2/8)

		4.Khatima Channel	a Channel					5.New Sh	5.New Sharda Sagar Feeder	Feeder				<u>6</u>	6. Old Sharda Deoha Feeder	1 Deoha I	reeder			
				ſ									1	[c						0
		renodical	Fenodical Discharge (cusec)		Accumulate	Accumulated Discharge (MCM)	(MCM)	renodical L	Feriodical Discharge (cusec)		ig a	Discharge	(A)	<u>r</u>	<u> </u>	narge (cus		nilat	Discharge	(MCM)
	Period	Actual (1)	Roster (2)	(1)/(2)	Actual (3)	Roster (4)	(3)/(4)	Actual (1)	Roster (2)	(1)/(2)	Actual Ro	Roster (4)	(3)/(4)	A C	Actual Roster (2)		(1) (2)	Actual (3)	Roster (4)	(3)/(4)
	03/23/90	N.A.	ō	Z.A.	N.A.	0	Z.A.	78	0	-		0		<u> </u>	0.0				0	
	04/05/50	О	0		Ą.Z	o	Ž.	551	0		11	0		_	0.0	O		O	0	
	04/12/90	0	8	860		1	Y.	878	0		25	o		L	0.489	008	85%	12	4.	85%
	04/19/90	ō		%O		2	Z.A.	1,098	0		4	Ö		L	798.0	008	100%	25	27	826
	04/26/90	Ϋ́	o	N.A.		7	Y.A.	839	Ö		28	0		<u> </u>	114.0	Ö		27		100%
	06/60/50	Ϋ́Z	0	Y Z	N.A.		Ä	0	ō		58	O		L.	0.0	0		27		100%
	05/10/90	ΝĀ		Z A	Z.A.A.	4	Z	115			9	0		<u>. </u>	0.0	008	%0	27		269
	05/11/50	Ϋ́Z	8	Ϋ́	Ϋ́	5	Z Z	230			42	0		<u> </u>	684.0	800	85%	39		71%
	05/24/90	Ϋ́Z	8	N.A.	Z.A.	9	Ϋ́	805	ō		78	0		L	684.0	008	85%	51		74%
A	05/31/90	Ϋ́	8	A.N.	A Z	8	A	805			92	0		L	471.9	008	80%	59	82	72%
	06/1/0/90	74		93%	Z	6	Z A	805		101%	105	14	769%	<u> </u>	799.0	800	100%	72		76%
43	06/14/90	77		888	ÄÄ	10	N.A.	805		101%	119	27	435%	L.	\$43.4	2008	9889	82		75%
	06/21/90	8		100%	Ą.Z	12	Z	069		%98	131	41	319%	_	501.0	008	63%	8		73%
-	06/28/50	69		86%	¥Z	13	ĄZ	460		57%	139	55	253%	L	641.6	008	80%	101		74%
	02/02/90	0		%0	A'A	15	N.A.	230		29%	143	89	208%	L	228.0	88	28%	105		70%
	05/11/20	0		960		16	A.A.	o L		9%0	143	82	174%	L_	0.0	88	%0	105		24%
-	04/17/20	0		%0	N.A.	17	Z.A.	805	008	101%	157	98	163%		0.0	88	%0	105		29%
	02/26/90	C	8	%0		19	Ϋ́	069		%98	168	110	154%	l	0.0	800	960	105		55%
	08/05/30	0		%0		20	ď Z	ō	800	960	168	123	137%	L_	0.0	800	%0	105		51%
	06/60/80	Ö		%0			Ϋ́	460		57%	176	137	129%	L	0.0	008	%0	105	219	48%
	08/16/90	0		%0	Z		Z A	ō		960	176	151	117%		0.0	800	%0	105	233	45%
_	08/23/90	40	8	20%	ÄÄ	24	∢ Z	069	800	260% 390%	188	181	114%	_	0.0	800	0%0	105	246	43%
	06/30/80	08		%001	Ϋ́Z	26	r Z	805		101%	202	178	113%		0.0	008	960	105	260	40%
	06/90/60	0		%0	NA	27	Α̈́	808		101%	216	192	112%		391.0	008	49%	112	274	419
	09/13/90	69		%98 86%		28	Y Z	805		101%	229	205	112%	L.	850.1	808	106%	126	288	44%
	06/20/60	0	08	960		30	N.A.	069	800	%98 %98	241	219	110%	Ŀ_	429.4	800	24%	134	301	4
	09/27/90	0		0%	N.A.	31	Ä	1,073		134%	260	233	111%	Ш	433.0	800	24%	141	315	45%
	A second	7		1				672		11102					306	701	150%			
	Avciage		5 6	ż				3 6	3 8	2111	٠.				3 6	3.8	100			
	Maximum	ď Ž		ď.			v	1,058		13/%					950	200	100%	•		

Table A.12 Weekly Comparison of Actual & Roster Discharge - 1990 Kharif (3/8)

	Ŷ	(3)/(4)			39%	46%	%96	147%	117%	112%	107%	109%	109%	110%	109%	106%	100%	92%	26%	87%	86%	84%	84%	85%	87%	88	91%	82%	33%		
	Accumulated Discharge (MCM)	නි 4) ඩ	Ì	Ö	5	10	10	10	15	21	27	32	37	42	47	52	57	62	89	73	78	83	88	92	7.6	101	105	110	114		
	lated Dis	Roster (4)	ö	0	73	5	10	15	18	24	28	34	9	94	51	55	57	57	28	63	29	70	74	79	84	06	96	8	106		
	Accum	Actual (3)																													
	usec)	(1)/(2)			39%	23%			58%	% 66	84%	120%	108%	118%	101%	77%	43%	0%0	14%	%L5	2689	%89	81%	100%	122%	138%	141%	106%	134%	93%	103%
Branch	scharge (c	Roster (2)		O	300	300	o	0	300	350	300	300	300	300	300	300	300	300	300	300	300	300	300	250	250	250	250	250	250	246	350
9.Bisalpur Branch	Periodical Discharge (cusec)	Actual F	0	ō	116	159	304	304	174	346	252	359	324	353	303	230	130	0	43	290	204	204	244	251	90K	346	353	592	335	229	359
E	1124		i		200	200	9/2	88		8	80	188	% 	8 8	L.	8	₂₀	%	%	%	 89	%	180	189	F8	<u>₽</u>	8	<u>%</u>	45%		
	(MCM)	(3)/(4)			147%	119%	169%	176%				97%				 								88%			46%	47%			
	Discharge	Roster (4)	O	0	21	41	41	41	62	82	103	123	144	164	185	205	226	246	267	288	308	329	349	370	390	411	431	452	472		
	Accumulated Discharge (MCM)	Actual R (3)	S	16	30	49	69	72	72	8	105	120	041	157	172	180	189	189	189	189	189	197	197	209	213	213	213	213	213		
eeder		9	-	-	<i>9</i> 69	%7%		_	260 000	%9%	71%	74%	98%	85%	71%	40%	43%	%O	000	<i>‰</i> 0	%0	38%	0%0	57%	19%	%O	%0	960	% 0	45%	%66
Deoha	nge (cuse	(2)	1	0	1,200	1,200	0	0	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,022	1,200
New Sharda Deoha Feeder	Periodical Discharge (cusec)	Roste	280	199	878		182	172	0			-	1,172			485		ō		0	0		0			0	0	0	0	460	1,182
8.Nev	Репос	Actual (1)			Ŀ		1								_												_				
	MOM	(3)/(4)										N A	Z.A.	Z A	N.A.	Z A	N.	Z,	A A	Y Z	Y Z	ΝΑ	Z.	Ϋ́	Z.	N.A.	N.A.	N.A.	Z. Ą.		
	ischarge (. (4)	0	0	ö	0	0	0	0	0	O	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	ō	0		
	Accumulated Discharge (MCM)	Actual Roster (3) (4	19	25	38	39	39	39	39	39	39	N.A.	N.A.	N.A.	A.	ÄÄ	N.A.	Ä.Ä	N.A.	N.A.	A.Z.	N.A.	X.	A A	A.Z.	N.A.	Z.A.	Z. A.	Ä.		
		(1)/(2)																													
ape	charge (cu	Roster (2)	0	0	С	0	0	0	Ö	0	0	0	0	0	o	0	0	0	0	0	0	0	0	C	0	0	0	0	٥	0	0
7.Nagra Escape	Periodical Discharge (cusec)	Actual Ro (1)	1,118	360	742	71	0	0	o	o	0	Z.	43	0	0	0	0	0	865	1,071	1,662	2,464	3,735	1,377	288	1,189	3,237	42,1	883	810	3,735
	7	Period	03/29/90	04/02/90	04/12/90	04/17/50	04/26/90	06/60/50	05/10/50	05/11/50	05/24/90	06/15/50	06/20/90	06/14/90	06/21/90	06/28/90	06/50//0	07/12/90	06/61//0	02//26/90	08/05/80	06/60/80	08/16/90	08/23/90	06/36/30	06/90/60	09/13/90	06/20/60	06/1/2/60	Average	Maximum

Table A.12 Weekly Comparison of Actual & Roster Discharge - 1990 Kharif (4/8)

		10.Nigohi Branch	i Branch					II.Loss u	11. Loss up to Bifurcation	ation				12.Bifurcation	cation				
:		Periodical I	Periodical Discharge (cusec)		Accumulate	Accumulated Discharge (MCM)	(MCM)	Periodical L	Periodical Discharge (cusec)		Accumulated Discharge (MCM)	Discharge (MCM	Periodical	Periodical Discharge (cusec)		Accumulated Discharge (MCM)	Discharge	(MOM)
	Period	Actual (1)	Roster (2)	8	Actual (3)	Roster (4)	(3)/(4)	Actual (1)	Roster (2)	[3]	Actual Re	Roster (4)	(3)/(4)	Actual (1)	Roster (2)	9	Actual F	Roster (4)	(3)/(4)
ــــ	03/29/90	0	0		0	0		AA		N.A.	A.A.	-	Ä,	4,458		113%	76	88	113%
ł	04/05/90	298	0		S	0		-114	\$	-28%	Z.A.	4.	N.A.	4,150	١.	93%	147	4	102%
	04/12/90	393	400	%86	12	7	173%	-585		-146%	Z.A.Z	21	ż Z	3,012	2,200	137%	199	181	110%
	04/19/90	401	400	100%	19	4	137%	677-		-195%	Z.A.	27	Z. A.	3,767		141%	263	122	116%
	04/26/90	57	0		20	14	144%	Z.A.	400	A.A.	N.A.	8	Z. A.	A.Z.	5,950	A'A	N.A	329	N.A
•	05/03/30	0	0		8	4	144%	Ϋ́Z	400	N.A.	Ą.Z	41	N.A.	Z Y	6,450	ZA	N.A.	439	N.A
ا	08/10/80	57	904	14%	21		101%	Z	400	N.A.	N.A.	84	Z.	A Z	4.670	A.Y.	N.A.	519	AX
	05/11/50	387	450	%98				Ϋ́	400	N.A.	Ą.Z	55	N.A	Z			NA	613	NA
	05/24/90	422	004	106%				Ϋ́	400	N.A.	A'N	62	Z	NA			N.A.	725	N N
Α	05/31/90	0	9	%0	35	42	82%	Z.A.	400	N.A.	N.A.	89	A Z	5.220	7,070	74%	NA	846	Ν̈́
	06//20/90	O		%0				2,462		9919	ZZ	75	ν V	5,32			NA	296	N.A
ــــ 45	06/14/50	29	400	796				1,784		446%	Z AZ	82	N.	6388	3 7.520	85%	ZZ	1.091	YZ.
, ,	06/21/90	286					١.	2,250		\$62%	Ϋ́Z	68	N.A.	5,611		75%	Z.A.	1.220	Ϋ́
	06/28/90	Ϋ́Z	8	N A	7.	L	Ϋ́	N.A.		N.A.	Ϋ́Z	8	N.A.	NA	7.520	N.A.	NA.	1,348	Y.Y
	06/50/20	A.Z.						Z.		N.A.	N.A.	133	N.A.A.	N.A.	_	N.A.	NA.	1.477	Y.
	04/17/90	Ϋ́Z	900	ΑÄ	L		Z	Z.A.		N.A.	Z.A.	110	N.A.	, X		N.A.	N.A.	1,606	Y
	02/19/90	Ż		Ϋ́Z				Z.		N.A.	Y.A.	116	Z.A.	ÄZ		A.Y.	N.A.	1,735	Ä
	04/26/90	Ϋ́Z	400	NA	Α̈́		∀ Z	Ą.Ż	400	N.A.	A.Z.	123	N.A.	A'Z	7,520	 V	-	1,863	A.N.
L	08/05/80	371		93%				1,529		382%	Ϋ́Z	130	N.A.	6.768	Ľ.			1,992	N.A
	06/60/80	258		65%		110	Ϋ́ Z	32		8%	Ϋ́Z	137	N.A.	6,655			N.A.	2,121	Z
	08/16/90	188		47%		117	A Z	703		176%	Z A	4.	Z Z	S 664	1 520		AN	2.249	Z
	08/23/80	303		67%	Z	125	Z	1,607		402%	N.A.	151	Z.	5.710			N.A.	2.378	₹ Z
	06/06/80	437		97%	Z	133	Z Z	77.5		18%	N.A.	157	Z	7,020			Ϋ́	2.507	Z
L	06/90/60	422	 -			140	Z	407	400	102%	N.A.	181	Z.	7,323	3 7.520		NA	2635	Z
A	06/13/60	185	954	41%	N.A.A.		Y Z	SOZ	400	-127%	Y.Y.	171	N. A.	6,282			NA	2,764	N.A
L	06/20/60	401		868		156	N.A.	302	904	-76%	Y Z	178	Z.	6,995	5 7,520	%86	Z.	2,893	A Z
*	06/12/60	535		119%			N.A.	1,053	400	263%	N.A.	185	N.A.	10,062			N.A.	3,022	Ϋ́
'		V 1X	25.4	2	,			7	900	2				N. M.					
. •	Average	¥ ;	+ C	į.			٠	Ċ,	9 6	i Ž				Y Z	יים מינים בי	V V			
	Maximum	ď Z	4 5 5	Ż.				ď Ž	9	ď. Z		-		ď.					

Table A.12 Weekly Comparison of Actual & Roster Discharge - 1990 Kharif (5/8)

	13.01d SI	13.Old Sharda Sagar Feeder	r Feeder	 			14.Khe	14.Khen Branch				*.	TSI. Har	15. Hardoi Branch Head	i Head			,
1	Periodical 1	Periodical Discharge (cusec)		Accumulated Discharge (MCM)	ed Dischar	ge (MCM)	Periodica	Periodical Discharge (cusec)	(casec)	Accumulated Discharge (MCM)	d Discharge	(MCM)	Periodical	Periodical Discharge ((cnsec)	Accumulated Discharge (MCM)	d Discharge	(MCM)
Period	Actual	Roster	10//17	Actual	Roster	(3)/(4)	Actual	Roster	(0)/(1)	Actual	Roster	. (k.)/(b)	Actual	Roster	(6)/(1)		Roster	63/69
03/25/90	743	1	(7)(1)	13	E	(£),((£)			(3)(1)	(5)	e E	(t)/(c)	3.026	3,950	- 1	(5)	89 E	17%
06/50/60	3			29		0	F		0	4.	0	T	3,088	1.			4	73%
04/12/90	289	0		41		0	1,894	2,200			38	122%	431			112	4	78%
04/19/90	495	270	183%	49		5 1064%	2,3		%86	98	7	110%	925			128	144	%68
04/26/90	N.A.	L	N.A.		38	N.A.	1,869		ic	118	67	1.50%	2,857	4,000			212	83%
06/60/50	N.A.	2,450	Z	A.A.	08		×		0	123	δħ	136%	3,497	4,000	87%	737	182	84%
05/10/90	N.A.	2,470	AZ		122	N.A.	1,864			155	116	133%	1,635			265	83	88
05/11/90	N.A.	70	NA	A.		_	2,2	2,200	%001 C		157	125%	2,86	3,200			335	88
05/24/90	N.A.		Z.A.		130		2,1				192	120%	3,05				\$	91%
08/31/90	187	870	%95		145	N.A.	2,2			269	525	117%	2,437	4,000	61%	408	472	86%
06/10/90	516			Y.	145		2,4		%98		777	112%	2,40	İ			3	83%
06/14/90	877	720	108%				2,805	5 2,800			325	110%	2,80				609	82%
06/21/90	420		28%		169		2,5		%£6 C		373	108%	2,596			7,7	677	80%
06/28/90	513	-	71%	N.A.	182	Z N.A.	N.A.	4. 2,800		N.A.	421	Ä,Ä	Y.Z	4,000	N.A.	4	746	Z.A.
06/50/20	499	720	%69		2		Y.		N.A.	N.A.	469	N.A.	Z		NA	Ϋ́	814	N.A.
07/12/90	376		52%				N.A.				517	Z.A.	Y Z		NA	Z A	883	N.A.
04/17/0	588	720	123%		219		ż			N.A.	565	N.A.	A'Z	4,000			951	N.
02/26/90	1.451		201%	A.N.			A.N.			N.A.	613	Z	Z				1,020	N A
08/05/90	487		%89		243		2,451			N.A	199	N.A.	3,829	4,000	%96	AN	1,088	NA
06/60/80	516	720	72%				2,38	30 2,800	%S8 C	N.A.	207	N.A.	3,75			N.A.	1,157	NA
06/17/80	8/1		22%				1,694			N.A.	60/	N.A.	3,19	ĺ		N.A.	1,225	N.A.
08/23/90	420		58%				1,985			N.A.	757	Z.A.	3,305				1,293	N.A.
06/36/80	513		71%		340		2,72			N.A.	\$	Z.A.	3,78	4,000			1,362	N.A.
06/90/60	499	·	<i>%</i> 69				2,805	2,800		N.A.	852	Z.A.	4,019	4,000	100%	Y.Y.	1,430	Z.
09/13/90	376		52%			N.A.	2,465			N.A.	8	Z.A.	3,440	4,000	%98	ΑΛ	1,499	NA
06/27/60	8885		123%	Z.A.A.	377	Z.A.	2,210	2,800	2667	Z,A	<u>\$</u>	Z.A.	3,900				1,567	N.A.
09/27/90	1,451	720	201%				3,542	2,800	0 126%	N.A.	966	N.A.	5,06	4,000	127%	N.A.	1,636	Z.A.
Average	N X	843	ď s Z Z				Z Z	A. 2,156	Z Z				N N	3,540				
Maximum	Ä	3,520	ď. Z				Ž						K Z	_	Z .			

Table A.12 Weekly Comparison of Actual & Roster Discharge - 1990 Kharif (6/8)

•		ISH Out	15ii. Outlet Channel from Sharda Sagar Dam	I from Si	narda Sag	ar Dam		15m.	15m. 15i + 15n	Ħ		• •			15iv.	Madhotz	15iv. Madhotanda Distributary	tributary			
L		Periodical 1	Periodical Discharge (cusec)	:usec)	Accumula	Accumulated Discharge (MCM)	ge (MCM)	Period	ical Dische	Periodical Discharge (cusec)		Accumulated Discharge (MCM)	Ascharge (MCM)	Penod	icai Disch	Periodicai Discharge (cusec)		Accumulated Discharge (MCM)	1 Discharg	e (MCM)
	Penod	Actual	Roster		Actual	Roster	1	Actuai	Roster	Ļ	Ac	Actual Ro	Roster		Actual	Roster	la la	ď	Actual	Roster	
		3	8	(1)/(2)	<u>©</u>	4)	(3)/(4)	3	ا ۱۰ س ند در ا	(2)	(1)/(2)	(3)	4	(3)/(4)	(1)	:	3	(1)/(2)	ල	£	(3)/(4)
L	03/29/90	1,041	0		1,	18 0	l	4		3,950	103%	70	89	103%		0	100	960	0	2	
l	06/50/50	1,362			4	1 0	l	4		4,450	100%	146	144	101%		0	150	260	0	4	ő
.	04/12/90	406	0		48	0 8	-		837	o		160	144	111%		O	0		0	4	
.	04/19/90	1,020			99			Ţ	1,945	0		193	144	135%		36	0		1	4	
1	04/26/90	2.247	1,600	140%	104			L.		5,600	%16 6	281	240	117%		107	150	71%	2	7	
L	06/60/50	2,073	1,600	130%	139			×.	5,570	5,600	%66	376	335	112%		146	150	27%	5	6	
J	05/10/50	1.784	C		170	55 0		m	3,419	ō		435	33.5	130%		21	0		5	6	8
L	08/11/50	2,495			213		5 388%	3	L	3,200	168%	526	390	135%		0	0		5	6	
ـــ ـــ	05/24/90	2,425	1,600					, 		5,600	28%	620	486	128%		8	150	80%	-	12	
A	05/31/90	2,257						4		5,600	84%	701	582	120%		141	150	\$	6	15	
- 2	06/0/90	2,217	1,630		188			4		2,600	83%	780	878	115%		150	150	100%	12	17	
17	06/14/90	2,138	١.	134%				4	4,943	5,600	%88 %88	864	774	112%		113	35	75%	14	20	
	06/21/90	1,078		67%				E.	_	5,600	(a),99	927	698	107%		126	350	84%	16	22	
	06/28/90	NA				:				5,500	N.A.	N.A.	965	N.A.		N.A.	150	N.A.	N.A.	25	
.	05/50/10	Y.A	1,600			247			ا	5,600	N.A.	N.A.	1,061	N.A.		N.A.	150	Z A	Z.	7.7	
_	02/17/0	N.A.	1,600	NA						2,600	NA	N.A.	1.157	N.A.		N.A.	150	N.A.	Z.	30	Z
نسا	04/119/50	NA			N.A.				N.A.	5,600	N.A	NA	1,253	N.A.		N.A.	150	Ϋ́	Z.	33	
L	07/26/90	A N								2,600	N.A.	N.A	1,349	N.A.		N.A.	150	A N	Z A	35	
	08/05/90	1,514	1,600		N.A.		Z Z Z	4)	5,343	5,600	95%	N.A	1,445	N.A.		0	150	%0	У 7.	38	ž
	06/60/80			103%	N.A.					2,600	826	N.A.	1,540	N.A.		39	150	26%	NA.	34	
	08/16/90	2,003						43		5,600	93%	N.A.	1,636	N.A.		0	150	0%0	NA.	43	
	08/23/90	2,018		126%				4,		5,600	95%	N.A.	1,732	N.A.		103	150	%69	Z.A.	45	
Ь.	08/30/80	1,773	1,600	111%	b.N.A.		Z.A.		5,560	5,600	<i>%</i> 66	N.A.	1,828	N.A.		150	150	100%	K.Z.	34	
<u>!</u>	06/90/60			100%	. ·			(1)		2,600	100%	N.A.	1,924	N.A.	ن نا	150	150	100%	N.A.	90	
ا۔۔۔۔ د	09/13/90	1,953	1,600	122%		L 521		ļ_,		\$,600	2696	N.A.	2,020	N.A.		61	<u>8</u>	%04	NA	S	
	06/50/60	1,601					AZ A			2,600	28%	A.Z	2,116	N.A.		105	35	70%	Z.	56	Z
اسا	09/27/90	2,135	1,600	133%	6 N.A.	376			7,204	5,600	129%	N.A.	2,211	N.A.		o	3.50	9%0	Y.Y.	35	
	Average	NA		. 1		٠.		,_		4,785	N.A.		-			Ä.	126	N.A.			
~	Maximum	N.A.	1,630	ZA	,		. •		Y Z	5,600	Ϋ́					Y Z	130	Z A			

Table A.12 Weekly Comparison of Actual & Roster Discharge - 1990 Kharif (7/8)

	(CM)	<u> </u>	(3)/(4)	68%	848	%89 988	127%	135%	141%	161%	157%	154%	151%	149%	146%	136%	133%	134%	120%	120%	121%	123%	123%	123%	123%	123%	122%	123%	125%	125%		
	Sischarge (A	Roster	€	1	83	78	28	42	56	56	70	<u>\$</u>	86	112	126	139	153	167	181	195	502	223	237	251	265	612	293	307	321	335		
Mile	Accumulated Discharge (MCM)	Actual Ro	<u></u>	101	97	19	35	27	79	8	109	129	147	166	183	190	204	224	218	234	教	275	291	308	325	344	358	376	104	419		
3.4 to 53			(1)/(2)	%89°	119%			151%	157%		141%	141%	132%	134%	124%	46%	100%	144%	45%	119%	143%	152%	113%	121%	124%	131%	100%	134%	178%	127%	125%	178%
between	charge (cus	Roster	3		815	0	0	815	815	0	815	815	815	815	815	815	815	815	815	815	815	815	815	815	815	815	815	815	815	815	724	815
15vii. Loss between 13,4 to 53 Mile	Periodical Discharge (cusec)	Actual Re	(3)	557	1967	415	*	1,233	1,283	623	1,147	1,145	1,075	1,095	1,011	373	817	1,176	-369	272	1,168	1,235	924	986	1,012	1,064	817	1,090	1,452	1,035	906	1,452
	To-	<u> </u>	_		L_	L_	<u></u>	L		L	L	L	L	L				L_	l		L_							L.	L			
	(MCM)		(3)/(4)	103%	104%	113%	136%	119%	114%	133%	136%	129%	125%	122%	119%	115%	111%	110%	102%	100%	101%	101%	101%	101%	101%	101%	101%	101%	101%	102%		
	Accumulated Discharge (MCM)	Roster	3	2	135	135	135	225	315	315	367	457	17.27	637	727	817	8	766	1,087	1,177	1,267	1,357	1,447	1,536	1,626	1,716	1,806	1,896	1,986	2,076		
	ccumulatec	Actual F	6	65	141	152	183	267	360	418	200	290	683	776	698	939	1,009	1,092	1,107	1,181	1,274	1367	1,457	1,548	1,639	1,730	1,820	1,910	2,000	2,120		
13.4 Mile			(1)/(2)	103%	106%		_	95%	104%		155%	100%	103%	103%	103%	79%	77%	93%	16%	82%	103%	103%	100%	102%	101%	101%	100%	100%	100%	134%	102%	134%
Branch]	harge (cus	គ្ន		3,715	4,165	0	0	5,255	5,255	0	3,065	5,255	5,255	5,255	5,255	5,255	5,255	5,255	5,255	5,255	5,255	5,255	5,255	5,255	5,255	5255	5,255	5,255	5,255	5,255	4,493	5,255
15vi. Hardoi Branch 13.4 Mile	Periodical Discharge (cusec)	Actual Ros	3	3,816	4,412	643	1,844	4,856	5,461	3,407	4,758	5,256	5,434	5,434	5,434	4,127	4,047	106,4	824	4,331	5,434	5,434	5,267	5,354	5,305	5,311	5,262	5,262	5,262	7,016	4.588	7,016
	- 	L		-	!				1.6	-	L.	1.6	L-	1	1	La	·		····	····						· · · ·	·	_	,			
	(MCM)		(3)/(4)	188%	108%	180%	204%	149%	%66	%8%	158%	140%	42%	-33%	%89	-93%	Z	NA	A'N	Ä.A.	Ϋ́Z	Z	N.A	N.A.	Z	Z Z	N.A.	Z	N.A	ΝΑ		
	Accumulated Discharge (MCM)	Roster	<u>£</u>	2	5	5	5	00	11	11	14	17	20	24	7.7	30	34	37	4	4	54	50	3	57	9	48	19	70	74	77		
	cumulate	Actual R	ල	4	5	8	6	12	11	11	21	42	6	φ	-18	-28	N.A.	Z.A.	Ä.	Z.A.	Z.A.A.	Z.A.	N.A.	N.A.	N.A.	Z A	Z.A.A.	Ä,	Ą.	N.A.		
Aile			(2)(2)	188%	29%			73%	-19%		449%	67%	452%	494%	-310%	-297%	N.A.	Z.A.	Z.A.	Z.A.	Z.A.	46%	25%	-81%	48	51%	107%	36%	%69	%96	Y X	Z. Ą
to 13.4 N	harge (cuse	क्	(3)	135	135	0	0	195	195	ō	135	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	195	167	195
15v. Loss up to 13.4 Mile	Periodical Discharge (cusec)	Actual Roster	Ξ	254	36	194	Ş	142	-36	-10	909	131	-881	-963	409	-580	N.A.	Z.A.	Z.A.	A.Z.	N.A.	-91	107	-158	-85	66	208	71	134	188	Ϋ́	Z A
<u> </u>		Period		03/29/90	04/05/90	04/12/90	04/13/90	04/26/90	06/60/50	05/10/50	05/17/90	05/24/90	05/31/90	06/L0/90	06/14/90	06/21/90	06/28/90	06/50/20	02//12/90	04/17/0	02/26/90	08/05/30	06/60/80	08/16/90	08/23/90	06/36/80	06/90/60	09/13/90	06/50/60	09/27/90	Average	Maximum
	L			L	<u> </u>	Ŀ	<u> </u>	L	J	l	<u>.</u>	L	A	L	1 <u>.</u> 48	<u>i </u>	ļ	J	1	<u>i</u> .	_	<u> </u>		L	L	Т	ا	ــــــــــــــــــــــــــــــــــــــ	ل	.1	1 4	. ~

Table A.12 Weekly Comparison of Actual & Roster Discharge - 1990 Kharif (8/8)

					٠.				Ė,	٠.		:			٠															
	(3)/(4)		0%0	260	250	%0	250	%0	960	0%0	%0	960	960	0%0	%0	0,60	% 0	%0	0%0	260	0%0	960	%0	%0	260	%O ·	% 0	0%0		
Roster	. (4)	0	I		1	7	12	12	12	18	23	28	30	35	Ø.	46	47	23	28	63	65	70	75	18	82	88	93	8		
	(3)	0	0	0	0	O	O.	0	0	0	ō	0	ю	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
	(1)/(2)		260			0%	9%0			%O	0%	0%0	0%0	%0	060	% 0	0%0	260	960	960	020	% 0	%O	%O	%O	% 0	%O	260		
Roster.	(2)	0	65	0	0	322	315	0	0	322	315	322	92	322	315	322	9	322	315	322	65	322	315	322	9	322	315	322	213	322
Actual	(1)														,															
	3)/(4)	112%	107%	124%	138%	115%	109%	127%	131%	123%	119%	116%	114%	111%	107%	105%	%86	26%	26%	26%	%%	97%	97%	%%	37%	97%	%96	%8% %		
		50	107	107	107	183	529	529	297	373	449	525	601	677	753	829	505	981	1,057	1,133	1,209	1,285	1,361	1,437	1,513	1,589	1,665	1,741		
		36	115	133	148	210	281	329	390	194	535	610	585	750	805	698	688	946	1,019	1,091	1,166	1,240	1,314	1.387	1,463	1,534	1,599	1,702		
7.7	(1)/(2)	112%	103%			82%	94%		161%	82%	98%	2686	100%	85%	73%	84%	27%	26%	26%	95%	28%	96 986	97%	%95	100%	888	%98 ************************************	135%	%86	135%
coster	3	2,900	3,350	0	C	4,440	4,440	o	2,250	4,440	4,440	4,440	4,440	4,440	4,440	4,440	4,440	4,440	4,440	4,440	4,440	4,440	4,440	4,440	4,440	4,440	4,440	4,440	3,768	445
	(1)	3,259	3,445	1,058	088	3,623	4,178	2,754	3,612	4,111	4,359	4,339	4,423	3,754	3,230	3,724	1.193	3,359	4,266	4,199	4,342	4,368	4,293	4,247	4,445	4,172	3,810	5,981	3,682	5.981
Period /		03/29/90	06/02/00	/12/90	04/19/90	04/26/90	06/60/50	05/10/90	05/11/50	05/24/90	08/11/80	2/05/20/9	5/14/90	5/21/90	2/28/90	02/02/20	04/17/0	04/1/20	07/26/90	08/05/90	3/06/60/8	3/16/90	08/23/80	06/36/30	06/90/60	09/13/90	06/20/60	06/22/60	Average	Maximum
	Actual Roster Actual Roster Actual Roster Actual Roster	Actual Roster Actual Roster Actual Roster Actual (1) (2) (1)/(2) (3) (4) (3)/(4) (1) (2) (1)/(2) (3)	Actual Roster Actual Actual<	Actual Roster Roster Actual Roster Boster Actual Roster Boster Actual Roster Actu	Actual Roster Actual Actual Roster Actual Actual<	Actual Roster Actual Actual<	Actual Roster Actual Actual Roster Actual Actual Actual Actual Actual Actual Actual Actual Actual Boster Actual Actual<	Actual Roster Actual Actual Roster Actual Actual<	Actual Roster Actual Actual Roster Actual Actual<	Actual Roster Actual Actual Roster Actual Roster Actual Actual<	Actual Roster Actual Actual Roster Actual Actual Roster Actual Actual<	Actual Roster Actual Actual<	Actual Roster Actual Actual Roster Actual Actual Roster Actual Actual<	Actual Roster Actual Actual Roster Actual Actual Roster Actual Actual<	Actual Roster Actual Actual Roster Actual Actual Roster Actual Actual<	Actual Roster Actual Actual Roster Actual Actual Roster Actual Actual<	Actual Roster Actual Actual Actual Boster Actual Actual<	Actual Roster Actual Actual Boster Actual Actual Boster Actual Actual<	Actual Roster Actual Actual<	Actual Roster Actual Actual<	Actual Roster Actual Actual Roster Actual Actual Roster Actual Actual<	Actual Rostert Actual Actual	Actual Roster Actual Actual Roster Actual Actual Actual Roster Actual Actual<	Actual Roster Actual Actual<	Actual Roster (1) (2) (1) (2) (1) (2) (3) (4) (4) (4) (4) (4) (4) (4)	Actual Rostert Actual Rostert Actual Rostert Actual (4) (3)(4) (1) (2) (1)(2) (3) (4) (3)(4) (1) (2) (1)(2) (3) (4) (3)(4) (1) (2) (1)(2) (3) (4) (3)(4) (1) (2) (1)(2) (3) (4) (3)(4) (1) (1) (2) (1) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4) <t< td=""><td>Actual Roster Actual Actual<</td><td>Actual Roster Actual Actual Roster Actual Roster Actual Roster Actual Roster Actual Actual<</td><td>Actual Roster Actual Actual Roster Actual Actual Roster Actual Roster Actual Actual<</td><td>Actual Roster Actual Roster (1) (2) (1)/(2) (3) (4) (3)/(4) 0 3.426 3.250 112% 36 50 112% 65 60 0 0 1 0 880 0 1433 107 138% 0 0 0 1 1 0 880 0 1439 107 138% 0 0 0 1 1 0 880 0 1438 107 138% 0 1</td></t<>	Actual Roster Actual Actual<	Actual Roster Actual Actual Roster Actual Roster Actual Roster Actual Roster Actual Actual<	Actual Roster Actual Actual Roster Actual Actual Roster Actual Roster Actual Actual<	Actual Roster (1) (2) (1)/(2) (3) (4) (3)/(4) 0 3.426 3.250 112% 36 50 112% 65 60 0 0 1 0 880 0 1433 107 138% 0 0 0 1 1 0 880 0 1439 107 138% 0 0 0 1 1 0 880 0 1438 107 138% 0 1

Table A.13 Weekly Comparison of Actual & Roster Discharge - 1989/90 Rabi (1/8)

	1.Sharda River	dver					2.Nepal	Nepal Channel					3.Sharda	3.Sharda Main Cana	त			
	Periodical D	Periodical Discharge (cusec)		Accumulate	Accumulated Discharge (MCM)	(MCM)	Periodical	Periodical Discharge (cusec)	cusec)	Accumulate	Accumulated Discharge (MCM)	(MCM)	Periodical	Periodical Discharge (cusec)		Accumulated Discharge (MCM)	Discharge	MCM)
Period	Actual	Roster	,	Actual	Roster		Actual	Roster		Actual	Roster		Actual	Roster	¥	Actual	Roster	
	(1)	(2)	(1)/(2)	(3)	(4)	(3)/(4)	Ξ	3	(1)/(2)	(3)	3	(3)/(4)	(1)	8	(1)/(2)	(3)	€	(3)/(4)
10/05/89	14,841	12,500	119%	254	214	119%	264	150	176%	5	60	176%	11,471	11,500	100%	196	197	100%
10/12/89	12,688	11,800	108%	471	416	113%	264		176%	6	10	176%	11,471		%001	393	394	1009
10/19/89	11,952	10,400	115%	929	594	114%	264	4 150	176%	14	00	176%	11,471	L	112%	688	698	103%
10/26/89	11,014	10,400	106%	8	772	112%	N.A.	150		N.A.	01	NA.	10,745		105%	773	745	104%
11/02/89	9,948	000.6	111%	1,035	976	112%	N.A.		A Z	A'Z	13	N.A.	9,775	8,850	110%	3	968	105%
11/05/89	9,122	8,500	107%	1,191	1,071	111%	N.A.			Y Z	15		8,949] .		1,093	1,039	105%
11/16/89	8,497	8,000	106%	1,336	1,208	111%	٧٧	. 150		YZ.	18		8324	ļ. 		1,236	1,173	105%
11/23/89	8,191	7,500	109%	1.476	1.337	110%	ΥZ			N.A.	21	Z.A.	8,018		109%	1,373	1,299	106%
11/30/89	7.487	7,000	107%	1.604	1,457	110%	N.A.			Ϋ́	23	N.A.	7,315			1,498	1,416	106%
12/07/89	6,992	6.500	108%	1 724	1,568	110%	Y.	150		N.A.	26		6,819			1,615	1,525	106%
12/14/89	6,226	9,000	104%	1,831		110%	N.A.		NA	ΥZ	28		6,053			1,719	1,625	106%
L	6,151	5,800	106%	1,936	1,770	109%	Y Z	150					5,978	5,650		1,821	1,722	106%
12/28/89	5,747	5,400	106%	2,034		109%	N.A.					Z.A.	5,577			1,916	1,812	106%
01/04/90	5354	5,200	103%	2,126		109%	N		N.A.				5,182		103%	2,005	1,898	106%
01/11/90	4,973	5,000	%66 666	2,211	2,037	109%	Z.						4,800			2,087	1,981	105%
01/18/90	4,706	5,000	8¥ %	2,292	2,122	108%	N.A.		N.A.	Ä.Ä.	41	Z.A.	4,533			2,165	2,064	105%
01/25/50	4,529	5,000	91%	2,369	2,208	107%	Z		N.A.	Ä.Ä.	4		4342	4,850		2,239	2,147	104%
02/01/90	4,341	4,900	%68	2,443		107%	N.A.	., 150		N.A.	\$		4,168			2,310	2,228	104%
05/08/30	5.284	4,900	108%	2,534	2,376	107%	Ŕ Z				\$		5,111	4,750		2,398	2,310	104%
02/15/90	6,052	4,900	124%	2,637		107%	K Z		N.A.		51		6,002		126%	2,501	2,391	105%
02/22/90	5,406	4,700	115%	2,730	2,340	107%	Ϋ́Z				3		5,386	4,550		2,593	2,469	105%
03/01/50	14,503	4,600	315%	2,978	2,619	114%	Z			L			6,861			2,710	2,545	106%
03/08/30	5,964	4.600	130%	3,080	2,697	114%	N.A					Z.A.	5,944			2,812	2,621	107%
03/12/90	6,352	4,600	138%	3,189	2,776	115%	Ä,			_			6,332	4,450	142%	2,920	2,697	108%
03/22/90	7,406	4,600	161%	3,316	2,855	116%	Z.A.	. 150	N.A.	N.A.	\$	Z.A.	6,486	4,450	146%	3,031	2,774	109%
Average	7,749	6,672	116%				N. A.	150					7,084		109%			
Maximum	14,841	12,500	119%				X.A	150	N.A.				11,471	_				

Table A.13 Weekly Comparison of Actual & Roster Discharge - 1989/90 Rabi (2/8)

	Accumulated Discharge (MCM)	Actual Roster	15 17		46 51 90%	N.A. 68 N.A.			N.A. 68 N.A.	N.A. 82 N.A.	N.A. 96 N.A.		N.A. 96 N.A.	96		96	8		96		N.A. 96 N.A.	96		96	8	N.A. 96 N.A.				
ha Feeder		5	1.	%06 0	%05 O	N.A.	O.A.	O N.A	O A Z	A N		O N.A.	0 N.A.	O N.A.	O NA.	O N.A.	O N.A.	O NA.	O N.A.	O N.A.	O N.A.	AN O	O A N	N.A.	O NA.	0 N.A.	O N.A.			2 N
6.Old Sharda Deoha Feeder	Periodical Discharge (cusec)	Roster	9.88	905.0	905.0 1.000	N.A. 1,000	N.A.	NA	A N	N.A. 800	N.A. 800	N.A.		N.A.	N.A.	N.A.	N.A.	Z.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.			4 CC A M
6.016	T						L		74%	L	L		74%			L,			124%						145%	145%	145%			
	Accumulated Discharge (MCM)	Roster	<u>1</u>	_	41	55	89	82	8	8	8	96	96	96	96	96					.:	96					96			
	Accumulated	Actual F		20			8		71	71	11.5	71	71	1/	79	86	116	611	119	119	119	119	121	13.5	139	139	139			26
Sagar Feede	ge (cusec)	(6)/(1)) 	800 43%					800 23%	0	0	0	0	0	0	0	0	ō	0	0	0	0	0	o	0	0	0			224 1.45%
5.New Sharda Sagar Feeder	Periodical Discharge (cusec)	Actual Roster	805	345	345	799	853	695	426	0	0	0	0	0	470	1,096	1,096	151	0	0	0	0	115	508	230	0	0			33.4
<u></u>	<u> </u>	<u> ₹</u>	1	1_	<u>l</u> .	<u>l</u> _		<u> </u>	1_	l	l	l	<u> </u>	L_	L	l_	<u> </u>	L	_	L_	1	<u> </u>	_		L		<u></u>	L)
	(MCM)	(3)/(4)	0%	14%	N.A.	Y.A.	N.A.	N.A.	Ϋ́Α	N.A.	Z A	Z.	Z.A.	N.A.	Ž Ž	N.A.	A.A.	Ą	Ä.	Ż Ż	e Z	۷ 2	Ϋ́	Z Z	N.A.	NA	N.A.	٠		
	Accumulated Discharge (MCM)	Roster	L	2	4	4	4	5	7	7		7		6	101	101	10	01	11	12	12			. 13	4:	15				
	Accumulat	Actual	L	0	Ä.Ä.		<u>.</u>	N.A.	N.A.	A'Z		N.A.	Z Z	Z	Y Z	N.A.	Z.	AZ AZ	L						AZ Z	A'N	Z A			
lel	(cnsec)	(0)(1)	1	80 29%	80 08	O.A.	O A'N	80 N.A.	80 N.A.	O N.A.	A.N.	0 N.A.	60 N.A.	60 N.A.	60 N.A.	A.Z.	e Z	0 X.A.		50 N.A.	S0 N.A.	e Z	O N.A.		50 N.A.	50 N.A.	O N.A.			47 Se
4.Khatima Channel	Periodical Discharge (cusec)	Roster			8						A	A.				A.	A.	A.			N.A.					Z.A.			-	
4 Khan	Periodica	Actual	-	_				-	_					A.N.	W.A.		A.Z.	A.N.). 1. 1/4	N.A.		A.V.	YZ O	AZ	A'N		N.A.			7
: .		Period	10/05/89	10/12/89	68/61/01	10/26/89	11/02/89	68/60/11	11/16/89	11/23/89	11/30/89	12/07/89	12/14/89	12/21/89	12/28/89	01/04/90	01/11/30	06/81/10	01/25/90	05/10/70	05/08/50	05/12/90	02/22/90	03/01/90	03/08/20	03/12/90	08/22/90			Atterage

Table A.13 Weekly Comparison of Actual & Roster Discharge - 1989/90 Rabi (3/8)

								r	8.New Sh	.New Sharda Deoha Feeder	eder				9.Bisal	9.Bisalpur Branch	G			
cal Discharge (cusec) Accumulat				Accumulated Discharge (MCM)	ated Discharge (MCM)	rge (MCM)			Periodical Discharge (cusec)	hscharge (cu		Accumulat	Accumulated Discharge (MCM)	e (MCM)	Periodic	Periodical Discharge (cusec)	(cusec)	Accumul	Accumulated Discharge (MCM)	arge (MC
Actual Roster Actual Roster (1) (2) (1)/(2) (3) (4) (3)/(4)	Actual Roster (1)/(2) (3) (4)	Actual Roster (1)/(2) (3) (4)	Actual Roster (3) (4)	Roster (4)		(3)/(4)			Actual []	Roster (2)	<u>(</u> 9	Actual (3)	Roster (4)	(3)/(4)	Actual (1)	Roster (2)	(1)/(2)	Actual (3)	Roster (4)	(3)/(4)
0	9 0	9				0	Γ		1,201	1,200	100%				E.			1	5	
0	0 58	28				0			1,201	1,200	100%	41		100%	3	304 3.	350 87%		10	12
0	0 71	71				0			1,201	1,200	100%	. 62			2				15	18
186 0 74 0	0 74	74				0			1,201	1,200	100%	82		100%		29	0		5	18
0	<i>CL</i> 0	1.4				0			1,037	0		100		122%			0		16	18
0 98 0 252	98 0	98				0			853	ō		115			L	0	0		16	18
1,708 0 116 0	0 116	116				0		_	583	1,200	49%	125	103						9	23
132 0 118 0	0 118	118				0			515	1,200	43%	133		108%	2	253 3(300 84%		11.	28
0 0 118 0	0 118	118				0			1,201	1,200	100%	\bar{X}							12	33
0 0 0 0	0 118	118				0			142	0		156				0	0		22	33
0 0 118 0	0 118	118				0			C	0		155		109%		36	0		33	33
0 133 0	0 133	133				0	ĺ		398	0		163		113%	1	136	0	2	रू रू	33
627 0 144 0	0 144	144				0			810	1,100	74%	177		109%	61				29	37
0 0 144 0	0 144	144				0			1,096	1,100	100%	196	181	108%			250 100%		13	41
0 0 144 0	0 144	144				0			1,096	1,000		215		108%	7				12	45
0 0 144 0	0 144	144				0			157	0		217				36	0	(*)	38	45
0 0 144 0	144	144				0			0	0		217				0	0	E.	88	45
0 0 144 0	144	144				0			0	0		217							11	45
0 0 144 0	144	144	·	·	·	0			736	1,100	9629	230	217	106%	2	244	250 98%		45	20
0 0 144 0	144	144				0			920	1,100	84%	246							<u></u>	54
0 0 144 0	0 144	144				0			157	0		248		105%		0	0	7	47	54
878 0 159 0	0 [0	159				0			0	0		248				0	0	7	47	54
132 0 161 0	0 161	161				0			0	0		248		105%	. : L	0	0	4	47	法
0	181	181				0			0	850	% 0	248				0	250 0%		1	58
2,362 0 221 0	0 221	221				0			263	006	29%	253	366	%56		0	250 0	960	47	62
																ļ 				_
517 0		0.0							591	622	95%				. — u	110 1.	146 76%	8 6		
		>							104.1	77.71	0/.751				'n			Q.		

Table A.13 Weekly Comparison of Actual & Roster Discharge - 1989/90 Rabi (4/8)

	.:	10 Nigohi Branch	1 Branch						I Foss ul	I. Loss up to Bifurcation	cation				12.Bifu	12.Bifurcation				
L								<u> </u>						1		,				
		Ferrodical.	Periodical Lischarge (cused)	cusec)	Accumul.	Accumulated Discharge (MUM)	arge (M		-enodical L	renodical Discharge (cused)		E	1 Discharge	SMCM SMCM	Penodic	Penodical Discharge (cusec)	cusec)	Accumulated Discharge (MCM)	ed Discharg	e (MCM)
	Penod	14.	Roster		Actual	Roster				Roster			Roster		Actual	Roster		Actual	Roster	:
ل		3	9	Ē	0	(4)	_	(3)/(4)	€	(2)	(1)/(2)	<u> </u>	€	(3)/(4)	a		Ē	<u>ତ</u>	€	ତ
L. <u>-</u>	10/05/89	44				8	6	~~ %%	126	400	24%	5	7	24%	7,360	50 7,170	0 103%		123	
L	10/12/89	401	500			14	17	84%	388	400	97%	80	14	61%	4,867	٠,	0 68%			85%
L	10/19/89	401		%08		-	56	83%	1,077	400	269%	27	21	130%	6,5	43 5,920	0 111%		347	
.	10/26/89	401	0		2		52	110%	N.A.	670	N.A.	N.A.	32	Ϋ́Z	7,630		0 116%		:	
٠	11/02/89	251	0		9	32 2	26	126%	N.A.	400	N.A.	Z.A.	39	ŔŻ	7,144	7,650	%86 C	574		
J	11/09/89	172	0		E.		26	138%	Z	900	Ä.Ä.	N.A.	46	Z.A.	5,632	32 7,070				
٠	11/16/89	122	450			37	33	112%	N.A.	400	N.A.	N.A.	53	Z.A.	4337				790	876
<u></u>	11/23/89	322		72%			41	105%	N.A.	400	N.A.	Y Z	-59	Ϋ́Z	4,00		0 115%	128	862	
L	11/30/89	451	450	100%			49	104%	NA	400	N.A.	N.A.	99	Ϋ́ Y	4					
·A	12/07/89	42	0		1		49	106%	Z A	400	√ VZ	∢ Z	73	Z.A.	5,525		0 93%		1,028	
·—	12/14/89	0	0					106%	N.A.	400		Z A	80	Y.A.	5,8	10 5,390	L	1,092	1,121	
L_ 53	12/21/89	286	0		,		8	116%	A'A'		A Z	N.A.	87	Ϋ́	3,8	49 5,190	74%	5 1.158	1,209	<u>.</u>
_	12/28/89	401	400	100%				114%	N.A.		A.A.	Z.A.	8	Z.A.	2,4	30 3,040			1.261	
۲.	01/04/90	401	\$	100%			62	113%	Z	400		Y Z	100	Y.Y.	2,666	+ :		545.1	1311	
L	01/11/90	401	8	100%			69	1111%	Ž.			Ϋ́	109	N.A.	2,892		-			35%
	01/18/90	57	0			8/	69	113%	A.A.	400	NA	Z.A.	116	Ϋ́	4,362					
	01/25/90	0	0				69	113%	N.A.	400	N.A.	Z.A.	123	Ϋ́	4,	ş.				
	05/01/20	217	0		3	82	69	118%	N.A.	400	N.A.	ĄŻ.	130	Ϋ́	3,023			1	1,582	
L	05/08/20	387	904				76	116%	Z,	400	N.A.		136	Ż.	2,569	69 2,550	1.7	1,537	.::	
L.,	05/17/20	344	400	86%		94	83	114%	N.A.		Z.A.		143	Ϋ́	9,4				1,671	: []
.	02/22/90	0	0				83	114%	N.A.	L	N.A.	N.A.	150	Z Z	4			1,698		%86
L	03/01/90	0	٥				83	114%	N.A.	004		A A	157	Z Ą	5,100	000 4 000		786		
L	03/08/90	0	0			94	83	114%	N.A.	:			164	∢ Z	5339	39 4,000	0 133%	1.877	1.878	100%
	03/15/90	0	8	%0				105%	Ϋ́Z		NA	ď Ż	171	Ϋ́	4,845	2.500	0 194%	1,960	1 921	
	03/22/90	87	400	22%		96	22	9666	Z A	900	A.N	Z V	177	Z	3,653	53 2,500	0 146%	2.023	1,964	103%
L																				
, ~,	Average	224			· 5				Z Ą	415	Z Z				4.7	-	0 103%	20		
~	Maximum	451	500	808	aı				Z	670	N.A.				7,630	30 7,650		₁ 20		-

Table A.13 Weekly Comparison of Actual & Roster Discharge - 1989/90 Rabi (5/8)

	13.01d St	13. Old Sharda Sagar Feeder	ar Feeder				14.Khen Branch	Branch					15. Hard	15. Hardoi Branch Head	Head			
	Periodical 1	Periodical Discharge (cusec)		Accumulate	Accumulated Discharge (MCM)	(MCM)	Periodical D	riodical Discharge (cusec)		Accumulated Discharge (MCM)	Discharge (MCM)	Periodical	Periodical Discharge (cusec)		Accumulated Discharge (MCM)	Discharge (MCM)
Period		Roster			Roster			Roster		Actual R	Roster		Actual	Roster		Actual R	Roster	
	(1)		(1)/(2)	<u>(G</u>	9	(3)/(4)	(1)	(3)	(1)/(2)	(3)	Ŧ	(3)/(4)	Đ	8	(1)/(2)	<u>ල</u>	£	(3)/(4)
10/05/89	3,165		80%	Ϋ́	909	%06	229	0		4	0		3,966		1	89	63	108%
10/12/89	1,217	3,500		75		63%	0	Ó		4	0		3,650	3,570		130	126	104%
10/19/89	1,312		%98	26	146	9619	1,287	ō	-	26	0		3,944	4,400		198	201	%86
10/26/89	1,608		% £68	125	149	%7 %	1,930		2696	59	34	172%	4,093			268	9/2	%15
11/02/89	1.484			150	170	%88	2,001	2,000		93	89	136%	3,659	4,400		331	352	94%
11/09/89	250		%LL		187	87%	2,180			131	116	112%	2,702	3300	%28	377	408	55
11/16/89	542	1.820	30%	173		79%	2,210	2,800	79%	168	164	102%	1,585			404	408	83
11/23/89	732	0		185		85%	316	0		174	1 <u>8</u> 2	106%	3,764		80%	468	88	8
11/30/89	285	o		195		%68 %68	0	0		174	164	106%	3,569			529	<u>¥</u>	8
12/07/89	878	0		205		84g	1,429	2,000		198	199	100%	3,517	3,950		290	612	8
	256			209		. 36%	2,001			232	233	100%	3,553		105%	650	029	8
12/21/89	1,978	2,590	469L	243		93%	1,401		84%	256	7.1.7	92%	471	0		859	029	8
<u>_</u>	1,055	044	240%	261	270	97%	1,375			280	322	87%	0	0		859	929	88
01/04/90	127	٥		263		%86 %	229	0		482	322	%88	2,311			869	719	8
06/11/10	37	0		264		%86	0	0		284	322	%88	2,855		106%	747	766	8
01/18/90	0	0		264		%86	1,551	1,800		310	353	%88	2,811	2,650		795	811	8
01/25/90	0	0		264	270	%86	2,318	2,400	9796	350	394	%68	1,867	2,000	93%	827	845	%86
02/01/90	206	1,	11%	368		%88 %	2,574		107%	394	435	91%	243			831	845	88
05/08/30	115	150	%9L	270		%88	2,281	2,400	95%	433	476	%16	173	0		834	845	8
02/12/90	1,102	0		288	305	95%	343	0		439	476	92%	3,246	2,600	125%	068	068	100%
02/22/90	831	0		303		%G6	718		72%	451	493	92%	3,203	3,150		44	\$	8
03/01/80	3.142	o		356		117%	1,005		100%	469	510	%75	623			961	566	8
03/08/30	2,339	0		396		130%	431		43%	476	527	%06	2,569	3,000		1,005	1,046	8
03/12/90	488	0		408		134%	1,079	2,500	43%	494	570	87%	3,102	0		1,058	1,946	101%
03/22/90	503	0		416	305	137%	174	0		497	570	87%	2,976	2,500	119%	1.100	1,089	102%
										-								
Average	973	713	137%				1,162	1,332	87%				2,591	2,545	102% 8.2%			
Maximum	0,100		Š				1,01	2000	2				no.					

Table A.13 Weekly Comparison of Actual & Roster Discharge - 1989/90 Rabi (6/8)

	(MCM)		(0)/(0)			8	33	84	8	8	62	8	67	70	2	2	70	81	88	81	83	87	8	8	7.	88	Ϋ́	72			
	scharge	៦	£	0	0	ĸ	S	∞	10	10	13	15	18	21	21	21	21	21	23	26	26	26	26	26	28	31	31	31			
	plated Di	Roster		0	ō	ō	7	4	9	9	8	10	12	14	4.	14	14.	17	19	21	21	21	21	21	21	21	21	22			
2	Accumulated Discharge (MCM)	Actual	<u>6</u>															L	-							- 10					
15iv. Madhotanda Distributary			(1)/(2)			0%	21%	8	80%		71%	88	88	216					100%	9699					0%0	960				72%	100%
anda Di	Periodical Discharge (cusec)	 	<u>છ</u>	0	0	150	150	150	150	0	150	155	150	150	0	0	0	0	150	150	0	0	0	0	150	150	0	o		72	150
/ladhot	al Disch	Roster		12	0	0	98	20	120	17	107	120	120	137	0	0	0	129	150	66	12	0	0	o	Ю	0	Ö	58		52	150
ISIV.	Periodic	Actual	9																											-	
Г	7	· [131%	117%	103%	101%	%% %%	%% %	05%	103%	102%	102%	8 8	102%	102%	100%	101%	101%	100%	101%	102%	103%	104%	100%	100%	103%	05%			
	ge (MC)	_	(3)(4)															1												1	
	Dischar	Roster	£	63	126	223	321	418	47	475	X	99	75.	85	856	856	¥	1,041	1,138	1,228	1,22	1,228	1,279	1,333	1,39	1,447	1.447	1,490			:
	Accumulated Discharge (MCM)	ual R	ල	83	147	230	323	408	466	ş	587	089	769	857	872	872	950	1,047	1,147	1,230	1,241	1,249	1,322	1,380	1,396	1,440	1,493	1,558			
	Acc	Actual	23	131%	103%	85%	95%	%88	102%		92%	36%	921%	968			87%	103%	103%	93%	~		142%	107%	26%	%98 %98	_	52%		05%	101%
	(casec)		(1)(2)							0					0	0					0	0					0		_		
+1511	ischarge	Roster	3	3,670	3.67	5,700	5,700	5.70	3300		5,460	5,660	5,370	5,760			5,310	5,510	5,660	5,250			3,010	3,150	3,660	3,0		2,500		3,6	5,760
15m. 15i +15m	Periodical Discharge (cusec)	Actual	Ξ	4.825	3,763	4,823	5.440	5,006	3,363	2,041	5,02	5,413	5,231	5,099	876	٥	4,613	5,660	5,803	4,859	670	459	4,261	3,363	953	2,569	3,102	3,800		3.641	5,803
5	Pe	\ <u>\</u>			<u></u>		L_	<u>_</u>		<u></u>	<u></u>	_	L		L		L	<u> </u>	_			L.					_			ı	
	MCM)		(3)/(4)			142%	123%	117%	133%	145%	134%	124%	124%	111%	115%	115%	111%	109%	108%	105%	107%	109%	111%	112%	109%	109%	109%	112%			-
E	Accumulated Discharge (MCM)		<u>£</u>	ō	ō	22	45	29	29	29	88	121	145	186	186	186	227	275	327	382	382	382	389	389	401	401	401	401	-		
gar Da	lated Dis	Roster		15	17	32	55	78	68	76	119	95 1	180	206	213	113	52	300	152	103	410	415	132	135	435	135	435	614			
arda Sa	Accumu	Actual	0																		`1			7			Ľ			_	
15ii. Outlet Channel from Sharda Sagar Dam	(38		(1)/(2)			68%	104%	104%			101%	27%	121%	65%			888	100%	% 66	92%			248%		%0					112%	25%
nannel	Periodical Discharge (cusec)	k-i	(2)	0	o	1,300	006,1	1,300	0	0	1,260	1,910	1,420	2,370	0	0	2,410	2,810	3,010	3,250	0	0	410	0	099	0	0	0	-	936	3,250
utlet C	al Disch	Roster		628	114				661	456	77		1,714		405			2,805	1		427	286	1,015	160	0	0	0	825	_	050	2,992
15ii. O	Periodic	Actual	3	σo	1	8	1,3	1,347	9	4	1,277	1,8	1,7	1,546	4		2,303	2,8	2,5	2,992	4	7	1,0					, w		7.7	2,5
		Period		10/05/89	10/12/89	10/19/89	68/97/01	11/02/89	11/09/89	11/16/89	11/23/89	11/30/89	12/07/89	12/14/89	12/21/89	12/28/89	01/04/90	01/11/90	01/18/90	01/25/90	05/01/50	05/08/30	02/15/90	02/22/50	03/01/90	03/08/20	03/15/90	03/22/90		19e	mmum
;		<u>ፈ</u>		10	Ŏ.	10	10	11/		Ê	Ê	Ê	L		L		ਰੋ	oį,	ĵo	01/	8	8	02	8	8	8	8	වී	_	Average	Maximum
										-			A	- 1	J	,													•		

Table A.13 Weekly Comparison of Actual & Roster Discharge - 1989/90 Rabi (7/8)

	MCM)	<u> </u>	(3)/(4)	%%	106%	119%	123%	125%	122%	128%	132%	136%	136%	135%	131%	131%	134%	137%	138%	134%	131%	135%	132%	129%	119%	117%	122%	121%		
	Hscharge ()	fer	£	4.	83	42	56	70	2	28	16	111	125	139	139	139	153	166	179	193	193	193	207	221	235	249	249	263	 	
file	umulated D	Actual Roster	<u> </u>	13	53	S S	89	87	102	107	129	152	170	188	183	183	205	227	247	260	254	262	275	286	281	291	303	319		
.4 to 53 N			(1)/(2)	%%	117%	145%	133%	136%	104%		156%	164%	131%	129%			158%	181%	142%	%O6			K %	277%	-32%	J007		112%		121% 164%
tween 13	arge (cusec	 		805	815	815	815	815	815	0	815	815	815	815	0	0	815	715	815	815	o	0	815	815	815	815	0	815		615 815
15vii. Loss between 13.4 to 53 Mile	Periodical Discharge (cusec)	nal Roster	(1)	169	953	1,179	1,083	1,105	728	323	1,271	1,339	1,065	1,052	-283	0	1,289	1,292	1,157	738	-334	438	1026	169	-258	567	718	910		745 1,339
[Pen	Actual							L	L	_														<u></u>	L	L			
	(MCM)		(3)/(4)	136%	123%	111%	108%	105%	106%	113%	11.1%	110%	109%	107%	108%	108%	106%	105%	105%	104%				108%	105%	104%	108%	109%		
	Discharge	Roster	3	9	121	212	304	396	447	744	535	979	712	804	408	8 48	892	981	1,072	1,156	1,156	1,156	1,204	1,256	1,313	1,359	1,359	1,400		
	Accumulated Discharge (MCM)	Actual	6	82	149	237	329	414	475	507	593	289	77.5	098	871	871	242	1,032	1,122	1,200	1,211	1,218	1,293	1,350	1,375	1,413	1,466	1,528		
3.4 Mile			(1)/(2)	136%	110%	%96	101%	%7%	119%	-	%86	103%	103%	916			80%	101%	100%	92%			155%	111%	44%	81%		154%		109%
Branch	harge (cuse	fēr		3,525	3,535	5,355	5,355	5355	3,015	0	5,115	5315	5,015	5,415	0	0	5,115	5,215	5,315	4,905	0	0.	2,815	3,015	3,315	2,715	0	2,365		 3,271 5,415
15vi. Hardoi Branch 13.4 Mile	eriodical Disc	Actual Roster	(1)	4,803	3,887	5,141	5,416	4,927	3,592	1,878	4,998	5,478	5,158	4,954	670	o	4,115	5,256	5,300	4,527	643	438	4,367	3,339	1,467	2,210	3,087	3,633		3,571 5,478
	_			2%	8	26	82	%	%	74%	200	82	 6%	200	894	186 177	Į.	<u></u>	Ą.	N.A.	A.Y.	Z A	N.A.	AN	4	N.A.	<u> </u>	<u> </u>	L	
	ge (MCM)		(3)/(4)	,	5 41%								9659-	-57%				N.A												
	d Dischar	Roster	€	2.5	41	ω.	11	15	1.	17	20	2,	2	31	31	31	Ě	39	42	46	4	46	49	51	55	57	57	35		
	Accumulated Discharge (MCM)		(C)	0.2	-2	L-	82	6-	-15	-13	7.	-17	18	-18	-14	-14	N.A.	N.A.	N.A.	ΥZ	N.A.	N.A.	Ϋ́	Z	A.	N.A.	N.A.	N.A.		
Viile			(1)(2)	- 7%	-92%	-163%	-32%	-21%	-259%		33%	95%	-23%	4%			Z.A.A.	A.	N.A.	Ä.	N.A.		-54%	17%	-263%	266%		81%		 Z Z
to [3.4]	harge (cus	iter	3	145	135	195	195	195	135	0	195	195	205	195	0	0	195	295	195	361	0	0	195	135	195	135	0	135		139 295
15v. Loss up to 13.4 Mile	Periodical Discharge (cused)	Actual Roster	(1)	10	-124	-318	-62	41	-349	145	\$	-185	47	7	206	Ö.	A.A.	A.A.	N.A.	N.A.	N.A.	21	-106	23	-514	359	15	110		N.A.
		Period 7		10/05/89	10/12/89	10/19/89	10/26/89	11/02/89	11/09/89	11/16/89	11/23/89	11/30/89	12/07/89	12/14/89	12/21/89	12/28/89	01/04/90	06/11/10	06/81/10	01/25/90	05/01/90	05/08/30	02/12/90	05/22/20	03/01/50	03/08/90	03/15/90	03/22/90		Average Maxirnum
	•												A	-:	56	•														

Table A.13 Weekly Comparison of Actual & Roster Discharge - 1989/90 Rabi (8/8)

					-		_					
		cal Discharge (cusec)	usec)	Accumula	Accumulated Discharge (MCM)	(MCM)	Periodical	Periodical Discharge (cusec)	Г	Accumulat	Accumulated Discharge (MCM)	(MCM)
Period		Roster		Actual	Roster		Actual	Roster		Actual	Roster	
	(1))	(1)/(2)	<u>(</u>	₹	(3)/(4)	.	63	(1)(2)	(3)	(4)	(3)/(4)
10/05/89	4,034		148%	69		148%	Z.A.	·	N.A.	N.A.	E .	Z.A.
10/12/89	2,935		108%		66 k	128%	Ϋ́		N.A.	A.A.		N.A.
68/61/01	3,962	05.2,4	87%	187	1	110%	NA	365	N.A.	AZ	13	N.A.
10/26/89	4,333		95%			105%	A.Y		XX	N.A.	19	Z.
11/02/89	3,822		848	327	326	100%	Z	265	N.A	Ą.		N.A.
11/09/89	2,744	2,200	125%			103%	A.N	o	N.A	NA	24	Y'Z
11/16/89	1.556	О		400	364	110%	N.A		NA	L		N.A.
11/23/89	3,727		87%				Y.Z		A Z	Z.		N.A.
11/30/89	4,140		22%				N.A.					
12/07/89	4,093		2010	_			Y Z	262				
12/14/89	3,903	4,600	85%				Z A			N.A.		Z.A.
12/21/89	653			889	\$ 665	103%	A Z	0	N.A.		39	
12/28/89	O	0		889		103%	YZ V	0	N.A.	N.A.		
01/04/50	2,826		88%		5 739	100%	N.	9/	N.A.	N.A.		A.
01/11/90	3,964		%88				Z					
01/18/90	4.143		82%			%8%	A.N.	272	N.A.	N.A.		N.A.
01/25/90	3,790		93%			%86	A.Z			NA		A'
02/01/90	11.6			156		%66	Y Z	10	١			Z
05/08/50	0			156	7 963	80%	AZ	ō	A.Z.	A.N.	42	Z
05/12/00	3.597		180%	1			Z.	2001		A.Z.		Y N
02/22/20	2,709	2,200	123%	1,065		103%	A'N			AN	61	Ϋ́Z
03/01/90	1,725		269		1,077	102%	N.A.	0	A.A.	NA		Z
06/80/50	1,643	1,900	88 8	1,122	1,110	101%	N.A	0	N.A.	N.A.	19	Z.A.
03/15/90	2,368	0		1,163	3 1,110	105%	Z	0	N.A.	N.A.	61	N.A.
03/22/90	2,722	1,550	176%	1,209	1,136	106%	Z	0	N.A.	N.A.	. 61	N.A.
Averace	7.877	2,656	106%			-	A Z	143	2			
)											

Table A.14 An Example of Re-distribution of water through Nagra Escape (1/2)

Present Condition

1989/90 Rabi

1989/90 Rat						The same of the same of the same of
Period	Nagra	S.S.Outlet	Hardoi 13.4M	Main	Hardoi H	Kheri H
	(*1) (6,500)	(2,800)	(5,700)	(11,500)	(4,400)	(2,800)
10/05/89	(*2) 374	(*3) 1,941	875	29	434	2,571
10/12/89	3,037	2,686	1,937	29	750	2,800
10/19/89	753	1,921	877	29	456	1,513
10/26/89	186	1,453	260	755	307	870
11/02/89	143	1,453	694	1,725	741	799
11/09/89	557	2,139	2,337	2,551	1,698	620
11/16/89	1,708	2,344	3,659	3,176	2.815	590
11/23/89	132	1,523	659	3,482	636	2,484
11/30/89	0	956	287	4,185	831	2,800
			469		883	
12/07/89	0	1,086		4,681		1,371
12/14/89	0	1,254	601	5,447	847	799
12/21/89	898	2,395	4.824	5,522	3,929	1,399
12/28/89	627	2,800	5.700	5,923	4,400	1,425
01/04/90	0	497	1,087	6,318	2,089	2,571
01/11/90	0	-5	40	6,700	1,545	2,800
01/18/90	0	-192	-103	6,967	1,589	1,249
01/25/90	0	-192	841	7,158	2,533	482
02/01/90	0	2,373	5,030	7,332	4,157	226
02/08/90	0	2,514	5,241	6,389	4,227	519
02/15/90	0	1,785	1,439	5,498	1,154	2,457
02/22/90	0	2,640	2,337	6,114	1,197	2,082
03/01/90	878	2,800	4,747	4,639	3,447	1,795
03/08/90	132	2,800	3,131	5,556	1,831	2,369
03/15/90	1,150	2,800	2,598	5,168	1,298	1,721
03/22/90	2,362	1,975	1,900	5,014	1,424	2,626

Remarks

^{*1:} capacity of canal(cusec)
*2: actual discharge of Nagra Escape
*3: remaining capacity before re-distribution

Table A.14 An Example of Re-distribution of water through Nagra Escape (2/2) After redistribution

1989/90 Rahi

1989/90 Ra	bi					_	
Period	Na	*******	S.S.Outlet	Hardoi 13.4M	Main	Hardoi H	Kheri H
	((*1) (6,500)	(2,800)	(5,700)	(11,500)	(4,400)	(2,800)
10/05/89	(*2) 0) (*3) 374-	374 (*4) (*5) 1,941	875	29	434	2,571
10/12/89	1,071	3,037_	1,937 2,686	L.937_	29	750	29: 2.800
10/19/89	<u>o</u>	753	753 1,921	877	29	456	
10/26/89	:- 0	186	186 1,453	260	755	307	870
11/02/89	0	143 .	143 1,453	694	1,725	741	799
11/09/89	0	557	557 2,139	2,337	2,551	1,698	620 590
11/16/89	0	1,708	1,118 - 2,344	3,659	3,176	2.815	
11/23/89	0	132	1,523	659	3,482	636	2,484
11/30/89		0	956	287	4,185	831	2,800
12/07/89		0	1,086	469	4,681	883	1,371
12/14/89		0	1,254	601	5,447	847	799 898
12/21/89	0	898_	2.395	4 824	5.522	3 929	1,399
12/28/89	0	627.	2.800	5700	5,923.	4,400	627 1 1,425
01/04/90		0	497	1,087	6,318	2,089	2,571
01/11/90		0	-5	40	6,700	1,545	2,800
01/18/90		0	-192	-103	6,967	1,589	1,249
01/25/90		. 0	-192	841	7,158	2,533	482
02/01/90		0	2,373	5,030	7,332	4,157	226
02/08/90		0	2,514	5,241	6,389	[4,227]	519
02/15/90		. 0	1,785	1,439	5,498	1,154	2.457
02/22/90	· · · · · · · · · · · · · · · · · · ·	0	2,640 878	2,337	6,114	1,197	2,082
03/01/90	0	878,	2,800	4,747	4,639	3,447	1,795
03/08/90	0	132	2,800	3,131	5,556	1,831	2,369 1,150
03/15/90	0	1,150 .	2,800 1,900	2.598	5,168	1.298	1,721 کے
03/22/90	o	2,362	1 .	1 900	5014	1,424	462 2,626

Remarks

- *1: capacity of canal(cusec)
- *2: discahrge of Nagra Esc. after re-distribution
- *3: actual discharge of Nagra Esc.
- *4: re-distributed water (cusec)
- *5: remaining capacity before re-distribution A 59



: Roster Discharge is zero

Table A.15 Irrigation Efficiency by Canal System with/without Project

Canal System	Kharif	nif	Rabi	j o	Remarks
	Present	Improved Present	Present	Improved	
Main Canal	56:0	0.97	0.92	0.95	Estimated from actual water distribution
(conveyance/operation efficiency)					Efficiency will be improved by wireless communication system.
Hardoi Branch at Head	0.70	0.75	52'0	0.77	op
(conveyance/operation efficiency)					
Hardoi Branch at 23 mile	0.73	0.78	0.78	0.80	op
(conveyance/operation efficiency)			,		
Hardoi Branch at 53 mile	0.75	08.0	0.80	0.82	о́р
(conveyance/operation efficiency)					
Hardoi Branch at 99 mile	0.78	0.83	0.83	0.85	op
(conveyance/operation efficiency)					
Hardoi Branch at Tail	08.0	0.85	0.85	0.87	op
(conveyance/operation efficiency)					
Kheri Branch at Head	0.70	0.75	0.75	0.77	op
(conveyance/operation efficiency)					
Lucknow Branch at Head	0.75	0.80	08.0	0.82	op
(conveyance/operation efficiency)					
Lucknow Branch at 72 mile	08.0	58'0	58.0	<i>L</i> 8.0	op
(conveyance/operation efficiency)					
Unnao, Purwa, Asiwan Branch	08:0	0.85	0.85	0.87	ор
(conveyance/operation efficiency)					
Distributary/Minor	08.0	0.85	0.85	0.87	Estimated based upon field measurement.
(conveyance/operation efficiency)				:	Partial lining and modernized facilities will enhance efficiency.
Watercourse	0.78	56'0	0.78	0.95	Estimated based upon the report on "Upper Ganga Project".
(conveyance efficiency)					Complete lining will enhance efficiency.
Farmland	0.70	0.80	09.0	0.70	Estimated based upon the report on "Upper Ganga Project".
(application efficiency)					On-farm works will improve efficiency.

Table A.16 Water Distribution under Present Condition (1/2) - Kharif

EI OVLE FSV FIR IS (9) (10) (11) (12) (20) (10) (11) (12) (20) (10) (11) (12) (20) (20) (12) (20) (21) 1,012 1,157 (22) 1,277 1,57 (23) 1,012 1,157 (24) 288 726 (27) 0,34 221 291 (28) 0,34 221 291 (28) 0,34 221 291 (29) 0,35 99 137 (20) 0,35 99 91 (20) 0,35 99 137 (20) 0,35 59 80 (20) 0,35 34 57	all System CCA All River All All Pick All Pick CONE CONE CONE CONE CONE CONE CONE CONE						Tr. 0.157100	1000						
(b) (3) (3) (4) (5) (6) (7) (6) (1) (13) (13) (13) (14) (14) (15) (14) (15) (15) (15) (15) (15) (15) (15) (15	(ii) (2) (3) (4) (5) (6) (6) (7) (6) (7) (7) (10) (10) (10) (10) (10) (10) (10) (10	Canal System	CCA	AIA	PIA	AIA/PIA	ASV			30N.E1	OVLE	FSV	FIR	SI
1,612,633 301,365 387,103 78% 4,305 0.55 0.80 0.67 0.05 1,157 1,	1,612,633 301,365 387,103 78% 4,305 0.55 0.80 0.67 0.03 1,271 1,572 1,572 1,572 1,573 1,		(1) (pa)	& g	(E)	4 (%)	MCM)	9	6	©	6 6	(MCM)	(MCIA)	£ 13 18 19 19 19 19 19 19 19 19 19 19 19 19 19
1,61,226 361,365 361,732 375,435 375	1,61,226 361,365 361,265 371,022 375,03 375,0	Sharda Main Canal												
1,000,086 (187,591) 29,443 77% 3265 0.55 0.00 0.77 0.31 1.072 1.157 1.000,086 (187,591) 29,443 77,477 78% 3,265 0.65 0.00 0.77 0.31 1.001 1.157 1.157 1.152,999 1.120,088 1.15,665 0.55 0.80 0.77 0.31 1.001 1.157 1.157 1.152,999 1.120,088 1.15,665 0.55 0.80 0.75 0.03 0.75 0.32 6.54 7.754 1.157 1.152,999 1.120,088 1.15,665 0.55 0.80 0.75 0.03 0.75 0.32 6.54 7.754 1.157 1.152,999 1.120,088 1.15,665 0.55 0.80 0.75 0.03 0.75 0.32 6.54 7.754 1.157 0.152,999 1.120,088 1.15,665 0.55 0.80 0.75 0.03 0.75 0.32 6.54 7.754 1.157 0.152,999 1.150,089 0.157 0.152,999 1.150,089 0.156,999 1.150,089 0.156,999 1.150,089 0.156,999 1.150,089 0.156,999 1.150,089 0.156,999 1.150,089 0.156,999 1.150,089 0.156,999 1.150,0	1,000,086 (187,591) 294,43 77% 3,265 0.55 0.80 0.70 0.31 1.07 1.157 1.	at Head	1,612,633	301,365	387,032	78%	4,395	0.55	0.80	0.67	0.29	1,275	1,927	%99
323.114 (60.385) 77.547 78% 960 0.55 0.80 0.70 0.31 228 403 403 77.77 12.299 12.208 181.865 76% 2.345 0.655 0.80 0.70 0.31 228 403 775 17.2 17.2 17.2 17.2 17.2 17.2 17.2 17.2	### 175772 17.208 18.865 77.547 78% 960 0.55 0.89 0.70 0.31 228 403 ### 126	at Bifurcation	1,080,886	(187,591)	259,413	72%	3,265	0.55	0.80	0.70	0.31	1,012	1.157	87%
1757.72 127.28 181.865 70% 2.365 0.55 0.80 0.70 0.31 715 754 756 668 0.55 0.80 0.70 0.31 715 754 756 668 0.55 0.80 0.75 0.32 654 726 658 668 0.55 0.80 0.75 0.33 654 726 658 658 0.55 0.80 0.75 0.33 654 726 658 658 0.55 0.80 0.75 0.33 659 655 655 0.55 0.80 0.75 0.33 659 655 0.55 0.80 0.75 0.33 659 655 0.55 0.80 0.75 0.34 221 231 754 754 75 754 756 0.55 0.80 0.78 0.34 221 231 754 756 0.55 0.80 0.78 0.35 99 137 125 0.55 0.80 0.75 0.35 0.80 0.35 99 137 125 0.55 0.80 0.75 0.35 0.80 0.35 99 137 125 0.55 0.80 0.75 0.35 0.80 0.35 0.35 99 137 125 0.55 0.80 0.75 0.35 0.80 0.35 0.35 0.35 0.35 0.35 0.35 0.35 0.3	ch Canal (55 miles) 688 ps 127,772 173,599 120,088 115,644 1178 2043 687 ps 2,045 687 ps 2,0	Kheri Branch Canal	323,114	(60,383)	12.57	78%	096	0.55	0.80	0.70	0.31	298	403	74%
T73.55 Fig. 12.00 (17.77) T73.55 Fig. 12.00 (17.77) T73.55 Fig. 12.00 (17.72) T73.57 Tig. 12.00 (17.72) T73.50 Tig. 12.00	T73772 2 17.208 18.55 70% 2.305 0.55 0.80 0.77 0.31 715 754 715 81.85 70% 2.045 0.55 0.80 0.77 0.32 754 773 772 2 12.008 17.5664 7.55 0.80 0.77 0.32 5.56 5.56 5.56 0.55 0.80 0.77 0.32 5.56 5.55 0.80 0.75 0.32 5.56 5.55 0.80 0.75 0.32 5.56 5.55 0.80 0.75 0.33 5.50 0.55 0.55 0.80 0.75 0.33 5.50 0.55 0.55 0.55 0.80 0.75 0.35 5.50 0.55 0.55 0.55 0.55 0.55 0.5	Hardoi Branch Canal					. *							
## T25.599 12,008 173,664 71% 2,043 0.55 0.80 0.77 0.32 654 726 1.00 0.50 0.55 0.80 0.75 0.33 550 655 0.55 0.80 0.75 0.33 550 655 0.55 0.80 0.75 0.33 550 655 0.55 0.80 0.75 0.33 0.55 0.55 0.80 0.75 0.33 0.55	71,672 8/25 17,586 173,664 71% 2,043 0,55 0,80 0,77 0,33 654 726 658 658 1,65% 0,55 0,80 0,77 0,33 654 726 658 658 1,65% 0,55 0,80 0,77 0,33 580 635 137 and control (55 miles) 308,771 48,733 74,105 66% 1,65% 0,55 0,80 0,78 0,34 221 221 221 and control (50 miles) 21,579 2,56% 36,771 70% 2,65 0,55 0,80 0,78 0,35 99 137 and control (50 miles) 27,570 17,272 23,417 74% 2,5% 0,55 0,80 0,80 0,35 99 137 and control (50 miles) 24,55 11,527 23,417 74% 2,5% 0,55 0,80 0,80 0,35 99 118 678 11,525 20,523 56% 15% 0,55 0,80 0,80 0,35 54 77 118 678 11,525 20,523 56% 15% 0,55 0,80 0,80 0,35 54 57 118 678 11,535 20,523 56% 15% 0,55 0,80 0,80 0,35 54 57 118 678 11,535 20,523 56% 15% 0,55 0,80 0,80 0,35 54 57 118 678 118	at Head	757,772	127,208	181,865	70%	2,305	0.55	0.80	6.0	0.31	715	72	95%
Canal (55 miles) 308,771 48,733 74,105 66% 651 0.55 0.80 0.75 0.33 560 635 137 143,279 152,479 17,271 17	Canal (55 miles) 368,771 48,733 74,105 6676 651 0.55 0.80 0.75 0.33 560 635 137	at 23 miles	723,599	123,008	173 664	71%	2,043	0.55	0.80	0.73	0.32	654	726	808
201 Canal (55 miles) 308,771 48,733 74,105 66% 651 0.55 0.80 0.78 0.34 221 291 all cath Canal (55 miles) 152,579 25,669 36,571 70% 265 0.55 0.80 0.78 0.35 99 137 and canal (Canal (50 miles) 97,570 17,237 23,417 74% 2.56 0.25 0.80 0.80 0.35 99 91 71,672 8,521 17,201 5.2% 154 0.55 0.80 0.80 0.35 54 47 1 85,511 11,535 20,523 56% 125 0.85 0.80 0.80 0.35 59 80 11,672 17,884 10,747 18,675 58% 189 0.85 0.80 0.80 0.35 59 80 11,672 11,672 17,896 88% 189 0.55 0.80 0.80 0.35 59 80 126 0.25 0.80 0.80 0.35 59 18 13,465 13,277 17,522 44% 17 0.55 0.80 0.80 0.35 59 18 13,465 13,277 17,834 18,675 58% 16,055 0.80 0.80 0.35 59 18 13,465 13,277 17,822 17,896 88% 189 0.55 0.80 0.80 0.35 59 18 13,465 13,277 17,822 17,896 88% 189 0.55 0.80 0.80 0.35 59 18 13,465 13,277 17,822 17,896 88% 189 0.55 0.80 0.80 0.35 59 18 13,465 13,277 17,822 17,896 88% 189 0.55 0.80 0.80 0.35 59 18 14,465 13,465 13,467 17,502 17,896 17,897 17 0.55 0.80 0.80 0.35 59 18 14,465 13,467 17,502 17,896 17,897 17 0.55 0.80 0.80 0.35 59 18 14,465 13,467 17,502 17,896 17,897 17 0.55 0.80 0.80 0.35 59 18 14,465 13,467 17,502 17,896 17,897 17 0.55 0.80 0.80 0.35 59 18 14,465 13,467 17,4	11.52.379 2.5.669 6.567 6.51 0.55 0.80 0.78 0.34 221 291 and the commanded Area and volume were collected from Intigation Department of UP. 11.52.379 2.5.669 36.571 70% 2.655 0.80 0.75 0.35 241 228 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	at 53 miles	668,895	109,628	160,535	%89	1,696	0.55	0.80	0.75	0.33	98	635	88%
al Camal (50 miles)	308,771 48,733 74,105 66% 651 0.55 0.80 0.75 0.34 221 291 and Canal (Canal (Lucknow Branch Canal (55 miles)							;					
noti Carial 152,379 25,669 36,571 70% 265 0,555 0,80 0,80 0,35 99 137 noti Carial (So miles) 71,672 8,521 17,207 23,417 74% 256 0,555 0,80 0,80 0,35 241 238 1 11,237 23,417 74% 256 0,555 0,80 0,80 0,35 241 238 1 11,435 20,523 56% 154 0,555 0,80 0,80 0,80 0,35 241 238 1 11,435 20,523 56% 154 0,555 0,80 0,80 0,80 0,35 244 71 11,537 21,436 22,438 74,566 126 0,555 0,80 0,	noti Canal 152,579 25,669 36,571 70% 2655 0.85 0.80 0.80 0.35 99 137 Canal (50 miles) 281,443 44,961 67,546 67% 731 0.55 0.80 0.75 0.33 241 238 1 Canal (50 miles) 71,672 8,521 17,237 74% 2.56 0.55 0.80 0.80 0.35 44 62 1 85,511 11,532 20,523 56% 126 0.55 0.80 0.80 0.35 54 62 118 111,128 20,523 56% 126 0.55 0.80 0.80 0.35 54 67 118 111,128 20,523 56% 126 0.55 0.80 0.80 0.35 54 57 118 111,128 20,523 56% 126 0.55 0.80 0.80 0.35 54 57 118 111,128 20,523 56% 126 0.55 0.80 0.80 0.35 54 57 118 11,128 20,523 56% 126 0.55 0.80 0.80 0.35 54 57 118 11,128 20,523 56% 126 0.55 0.80 0.80 0.35 56 118 118 11,128 20,523 56% 126 0.55 0.80 0.80 0.35 56 118 118 11,128 20,523 56% 126 0.55 0.80 0.80 0.35 56 118 118 118 118 118 118 118 118 118 11	at 99 miles	308,771	48,733	74,105	%99	651	0.55	0.80	0.78	0.34	122	291	76%
noth Canal 152,379 25,669 36,571 70% 265 0.55 0.80 0.80 0.35 99 137 Canal (30 miles) 21,443 44,961 67,246 67% 731 0.55 0.80 0.75 0.33 241 238 1 Canal (30 miles) 77,570 17,271 23,417 74% 2.26 0.25 0.80 0.80 0.35 54 47 1 S	Inch Canal 281,443	Asiwan Branch Canal				٠.								
noth Canal 281,443	nch Canal al 281,443	atTail	152,379	25,669	36,571	70%	265	0.55	080	0.80	0.35	8	137	%89
Canal (50 miles) Canal (50 miles) Canal (50 miles) Canal (50 miles) 71,572 17,237 23,417 74% 256 6,255 6,80 6	Canal (SO miles)	Purwa, Unnao Branch Canal												
Canal (50 miles) S7,570 T1,672 S,5417 T4% S,558 S,68 S,78	Canal (50 miles)	•										:		
Canal (50 miles) Canal (50 miles) 97,570 17,572 8,521 11,535 20,523 8,567 154 0.55 0.80 0.80 0.80 0.35 44 62 154 0.55 0.80 0.80 0.80 0.35 44 17 18 11,535 14,522 17,896 8,37 17,814 10,747 18,675 8,97 17,814 10,747 18,675 18,97 17,814 10,747 18,675 18,97 17,814 10,747 18,675 18,97 17,814 10,747 18,675 18,97 17,814 10,747 18,675 18,675 18,97 17,814 10,747 18,675 18,97 17,814 10,747 18,675 18,97 17,814 10,747 18,675 18,97 17,814 10,747 18,752 14,475 17,814 18,675 18,97 17,814 18,675 18,97 17,814 18,675 18,97 17,814 18,675 18,97 17,814 18,675 18,97 18,97 19,90-and lingation close of Main/Branch 19,90-and lingation requirements 11,816,679 11,916,619 11,916 11,916,619 11,916,619 11,916 11,916,619 11,916	Canal (50 miles) 97,570 17,277 23,417 74% 256 0,55 0,80 0,80 0,15 0,15 241 258 154 256 0,55 0,80 0,80 0,35 44 62 11,672 85,511 11,535 20,523 56% 126 0,55 0,80 0,80 0,35 44 62 14,022 17,814 10,747 18,675 256% 126 0,55 0,80 0,80 0,35 29 18 18 19 10,465 11,806 83% 16 16 16 16 17,807 18 18 17 18 18 17 18 18 18 1	Cucknow Branch Canal			į	ţ	į	ì	6	į			Š	£
Canal (30 miles) 97,570 17,237 23,417 74% 2.56 0.55 0.80 0.80 0.35 90 91	Canal (30 miles) 97,570 17,277 23,417 74% 256 0,55 0,80 0,80 0,80 0,35 99 91 11,572 85,511 11,535 20,523 56% 126 0,55 0,80 0,80 0,35 54 47 11 11,535 20,523 56% 126 0,55 0,80 0,80 0,35 59 91 11 11,535 14,522 17,886 836% 126 0,55 0,80 0,80 0,35 59 80 11 11,535 14,522 17,886 836% 126 0,55 0,80 0,80 0,35 59 11 11 11,535 11,522 17,886 836% 126 0,55 0,80 0,80 0,35 59 80 11 11,535 11,465 126 126 0,55 0,80 0,80 0,35 18 18 18 19 11,535 11,465 11,532 11,465 11,532 11,465 11,532 11,465 11,532 11,465 11,532 11,465 11,532 11,465 11,532 11,465 11,532 11,465 11,532 11,465 11,532 11,532 11,532 11,532 11,532 11,532 11,532 11,532 11,532 11,532 11,532 11,532 11,532 11,533 11,465 11,532 11,533 11,465 11,532 11,532 11,532 11,532 11,532 11,532 11,532 11,532 11,532 11,533 11,465 11,532 11,533 11,532 11,532 11,532 11,532 11,533 11,532 11,532 11,532 11,533 11,532 11,533 11,532 11,533 11,532 11,533 11,532 11,533 11,53	al Head	143	Ŕ	07,70	0/10	151	C. 53	3	U	0.33	47	7.58	100%
97,570 17,237 23,417 74% 2.55 0.55 0.80 0.80 0.35 90 91 71,672 8,521 17,201 5.2% 1.54 0.55 0.80 0.80 0.35 54 47 1 85,511 11,535 20,523 5.6% 1.26 0.55 0.80 0.80 0.35 54 62 74,565 14,922 17,896 83% 1.68 0.55 0.80 0.80 0.35 59 80 77,814 10,747 18,675 5.8% 96 0.55 0.80 0.80 0.35 34 57 77,814 10,747 18,675 5.8% 96 0.55 0.80 0.80 0.35 34 57 91,465 3,327 7,552 44% 17 0.55 0.80 0.80 0.35 34 57 10, Conveyance loss of Distributary-Minor (3) Conveyance loss of Distributary-Minor (3) Overall impation efficiency of watercourse (4) Supplied volume to fermiland (11) Field impation refliciency of watercourse (12) Impation sufficiency inclusive of conveyance efficiency of watercourse (12) Impation sufficiency inclusive of conveyance efficiency of watercourse (12) Impation sufficiency inclusive of conveyance efficiency of watercourse (12) Impation sufficiency increase requirements efficiency measurement and "Upone Chances Project" and FAO Imrastion and Distinace Paper	97,570 17,237 23,417 74% 2.55 0.55 0.80 0.80 0.35 90 91 71,672 8,521 17,201 5.2% 1.54 0.55 0.80 0.80 0.35 54 47 1 85,511 11,535 20,523 56% 1.25 0.55 0.80 0.80 0.35 54 47 1 74,565 14,922 17,896 83% 168 0.55 0.80 0.80 0.35 59 80 32,638 5,485 7,833 70% 87 0.55 0.80 0.80 0.35 59 80 11,465 3,327 7,552 44% 17 0.55 0.80 0.80 0.35 34 57 21,465 3,327 7,552 44% 17 0.55 0.80 0.80 0.35 34 57 21,465 3,327 7,552 44% 17 0.55 0.80 0.80 0.35 6 18 (3) Conveyance loss of Distributary/Afrior and Paralla infigation sufficiency to crop water requirements igation area and volume were collected from Irrigation Department of UP (11) Field irrigation sufficiency to crop water requirements igation area and volume were collected from Irrigation Department of UP (12) Irrigation sufficiency to crop water requirements igation area and volume were collected from Irrigation Department of UP (13) Irrigation area and volume were collected from Irrigation Department of UP (14) Field irrigation sufficiency to crop water requirements igation area and volume were collected from Irrigation Department of UP (15) Irrigation area and volume were collected from Irrigation Department of UP (16) Supplied Applied Transpilled to crop water requirements of UP (17) Irrigation area and volume were collected from Irrigation Department of UP (18) Transpilled irrigation sufficiency to crop water requirements of UP (18) Transpilled irrigation and Drainage Paper	Sandila Branch Canal (50 miles)			. :					-	. 1	- ;	:	,
71,672 8,521 17,201 52% 154 0.55 0.80 0.80 0.35 54 47 1	71,672 8,921 17,201 52% 154 0.55 0.80 0.80 0.35 54 47 1 1 85,511 11,535 20,523 56% 126 0.55 0.80 0.80 0.35 59 80 1 1 4,522 17,896 85% 168 0.55 0.80 0.80 0.35 59 80 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	at 72 miles	97,570	17,237	23,417	74%	256	0.55	0. 0.	080	0.35	ଝ	6	866
71,672 8,921 17,201 5,2% 154 0.55 0.80 0.80 0.35 54 47 11 11,535 20,523 56% 126 0.55 0.80 0.80 0.35 54 47 62 23 26,531 11,535 20,523 56% 1.26 0.55 0.80 0.80 0.35 59 80 29 11 11,535 20,523 7,0% 87 0.55 0.80 0.80 0.35 59 80 29 11 11,535 20,532 7,0% 87 0.55 0.80 0.80 0.35 59 80 29 11 11,535 20,532 7,0% 87 0.55 0.80 0.80 0.35 59 18 18 11,535 20,532 7,833 7,0% 87 0.55 0.80 0.80 0.35 5 6 18 18 18 11,531 11,532 1,465 3,327 7,532 44% 17 0.55 0.80 0.80 0.35 6 18 18 18 18 18 18 18 18 18 18 18 18 18	11,672 8,921 17,201 52% 154 0.55 0.80 0.80 0.35 54 47 1	• • • • • • • • • • • • • • • • • • •					:	2						
71,672 8,921 17,201 52% 154 0.55 0.80 0.80 0.35 54 47 1	1,672 8,921 17,201 52% 154 0.55 0.80 0.80 0.35 54 47 1	Sandila Branch Canal				;	į	1		1	1	1		
R5511 11.535 20,523 56% 125 0.55 0.80 0.80 0.35 44 62 62 62 62 62 62 62	85.511 11.535 20,523 56% 126 0.55 0.80 0.80 0.35 44 62 74,565 11.595 20,523 56% 126 0.55 0.80 0.80 0.35 44 62 74,565 14.922 17,896 88% 168 0.55 0.80 0.80 0.35 39 29 1 32,638 5,485 7,833 70% 87 0.55 0.80 0.80 0.35 34 57 71814 10,747 18,675 58% 96 0.55 0.80 0.80 0.35 34 57 14 18 675 58% 96 0.55 0.80 0.80 0.35 34 57 18 675 3,327 7,552 44% 17 0.55 0.80 0.80 0.35 6 18 18 18 18 18 18 18 18 18 18 18 18 18	at Head	71,672	8,921	17,201	52%	X	0.55	0.80	& . O	0.35	Ż,	47	100%
85,511 11,535 20,523 56% 126 0.55 0.80 0.80 0.35 44 62 62 74,565 114,922 17,896 83% 168 0.55 0.80 0.80 0.35 59 80 29 1 32,638 5,485 7,833 70% 87 0.55 0.80 0.80 0.35 34 57 77,814 10,747 18,675 38% 96 0.55 0.80 0.80 0.35 34 57 77,814 10,747 18,675 38% 96 0.55 0.80 0.80 0.35 34 57 118 and irrigated area posed Irrigated area posed Irrigated area will irrigated area and supplied volume. (B) Conveyance loss of Main/Branch (B) Irrigation area and volume was estimated based unon measurement and "Under Cannes Proiect" and FAO Infraction and Drainate Paper	11,535 20,523 56% 125 0.85 0.80 0.35 44 62 62 62 62 63 63 63 64 62 63 64 62 64 65 65													:
85,511 11,535 20,523 56% 126 0.55 0.80 0.80 0.35 44 62 74,565 14,922 17,896 83% 168 0.55 0.80 0.80 0.35 59 80 77,814 10,747 18,675 58% 96 0.55 0.80 0.80 0.35 34 57 11 11 11 11 11 11 11 11 11 11 11 11 11	85,511 11,535 20,523 5% 125 0.55 0.80 0.80 0.35 44 62 74,565 14,922 17,896 83% 168 0.55 0.80 0.80 0.35 59 80 77,814 10,747 18,675 3,327 7,552 44% 17 0.55 0.80 0.80 0.35 34 57 11,465 3,327 7,552 44% 17 0.55 0.80 0.80 0.35 34 57 11,465 3,327 7,552 44% 17 0.55 0.80 0.80 0.35 34 57 (7) Conveyance loss of Distributary/Minor (8) Conveyance loss of Distributary/Minor (9) Overall irrigation efficiency of waterocurse plication and officiency of waterocurse of terminated based upon measurement and "Upper Ganges Project" and FAO Irrigation and Drainage Paper (12) Irrigation sufficiency to crop water requirements of UP (13) Facel irrigation sufficiency to crop water requirements to fIPD	Asiwan Branch Canal				,								
74,565 14,922 17,896 83% 168 0.55 0.80 0.80 0.35 59 80 29 11 22,638 5,485 7,833 70% 87 0.55 0.80 0.80 0.35 59 80 29 11 24,552 17,814 10,747 18,675 58% 96 0.55 0.80 0.80 0.35 34 57 31,465 3,327 7,552 44% 17 0.55 0.80 0.80 0.35 6 18 20 29 11 20,000 20 20 20 20 20 20 20 20 20 20 20 20	74,565 14,922 17,896 83% 168 0.55 0.80 0.80 0.35 59 80 77 81 7,833 70% 87 0.55 0.80 0.80 0.35 59 80 29 11 31,465 3,327 7,552 44% 17 0.55 0.80 0.80 0.35 34 57 18 57 84% of CCA) Iturable commanded area Usual supplied volume were collected from Imigation Department of UP ingation area and volume were collected from Imigation Department of UP ingation area settimated based upon measurement and "Upper Ganges Project" and FAO Imigation and Drainage Paper in the process of the properties of the process of the proces	at Head	85,511	11,535	20.523	86%	126	0.55	08.0	0.80	0.35	4	62	71%
74,565 14,922 17,833 70% 83% 168 0.55 0.80 0.80 0.35 59 80 1.20,538 5,485 7,833 70% 87 0.55 0.80 0.80 0.35 59 80 1.20 17,814 10,747 18,675 88% 96 0.55 0.80 0.80 0.35 34 57 18 18 19 19 19 19 19 19 19 19 19 19 19 19 19	74,565 14,522 17,896 83% 168 0.55 0.80 0.80 0.35 59 80 10,000 0.35 5,000 0.35	During Branch Canal						٠						
### 10,747 18,675 58% 96 0.55 0.80 0.80 0.35 30 29 1 T7,814	17,814 10,747 18,675 58% 96 0.55 0.80 0.80 0.35 30 29 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	at Head	74 565	14 922	17.806	838	8	95 0	8	8	0.35		8	749
turable commanded area 17,814 10,747 18,675 58% 96 0.55 0.80 0.80 0.35 34 57 18,675 44% 17 0.55 0.80 0.80 0.35 34 57 19,00 or veyance ioss of Distributary/Minor (3) Conveyance ioss of Distributary/Minor (4) Overall imgation efficiency of watercourse ingation area and volume were collected from Irrigation Department of UP (12) Irrigation sufficiency to crop water requirements in "Upper Games Project" and FAO Irrigation and Drainage Paper.	turable commanded area tal 10,747 18,675 58% 96 0.55 0.80 0.80 0.35 34 57 31,465 3.327 7.552 44% 17 0.55 0.80 0.80 0.35 34 57 (7) Conveyance loss of Distributary/Minor (8) Conveyance loss of Main/Branch (9) Overall imigation efficiency of watercourse plication area and volume were collected from Irrigation Department of UP (11) Field imigation suffency to crop water requirements in the paper and volume were collected from Irrigation Department of UP (12) Irrigation suffency to crop water requirements (12) Irrigation and Drainage Paper (12) Irrigation and Drainage Paper (13) Irrigation and Drainage Paper (14) Irrigation and Drainage Paper (15) Irrigation and Drainage Paper (17) Irrigation and Drainage Paper (18) Irrigation and Drainage Paper (19) Irrigation and Drainage Irrigation and Drainage (19) Irrigation and Drainage Irrigation and Irrigation and Irrigation and Irrigation and Irrigation and Irrigation an		30.639	500.5	7 833	3 60	6	350	200	8 6	250		, c	100%
turable commanded area 11,465 3,327 7,552 44% 96 0,55 0,80 0,80 0,35 34 57 12,52 44% 17 0,55 0,80 0,80 0,35 6 18 (7) Conveyance loss of Distributary/Minor (8) Conveyance loss of Main/Branch (9) Overall imigation efficiency of watercourse ligation area and volume were collected from Irrigation Department of UP 12) Irrigation sufficiency to crop water requirements efficiency was estimated based upon measurement and "Upper Gances Project" and FAO Imigation and Drainage Paper.	turable commanded area (7) Conveyance loss of Distributary/Minor (8) Conveyance loss of Distributary/Minor (9) Cornelyance loss of Main/Branch (9) Overall imgation placency (10) Supplied volume to farmland (11) Field imgation requirements (12) Irrigation sufficiency to crop water requirements (12) Irrigation sufficiency to crop water requirements (13) Irrigation sufficiency to crop water requirements (14) Prominal Mayor Perpartment of UP turable commanded area (15) Irrigation sufficiency to crop water requirements (16) Turable Drainage Paper	at 50 titles	850,40		000	2	ò .	}	8	3	5	٠	ì	
10,747 18,675 58% 96 0.55 0.80 0.80 0.35 34 57 11,7814 10,747 18,675 44% 17 0.55 0.80 0.80 0.35 34 57 12,1465 3,327 7,552 44% 17 0.55 0.80 0.80 0.35 6 18 13,465 3,327 7,552 44% 17 0.55 0.80 0.80 0.35 6 18 14,145 1,14	turable commanded area (7) Conveyance loss of Distributary/Minor (8) Conveyance loss of Main/Branch (9) Overall imgation efficiency turable avolume to farmland (10) Supplied volume to farmland (11) Field imgation sufficiency to crop water requirements tigation area and volume were collected from Irrigation Department of UP telficiency was estimated based upon measurement and "Upper Ganges Project" and FAO Irrigation and Drainage Paper	Unnao Branch Canal								-				
(1) Culturable commanded area (2) Actual irrigated area (3) Proposed Irrigated Area(24% of CCA) (4) Rate of AIA to PIA (5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse (7) Conveyance loss of Distributary/Afinor (8) Conveyance loss of Nair/Branch (9) Overall irrigation efficiency (10) Supplied volume to farmland (11) Field irrigation requirements (6) Application efficiency inclusive of conveyance efficiency of watercourse (12) Irrigation sufficiency to crop water requirements (13) Irrigation sufficiency makes estimated based upon measurement and "Upper Canness Project" and FAO Irrigation and Dizanage Paper	(1) Culturable commanded area (2) Actual irrigated area (3) Proposed Irrigated area (3) Proposed Irrigated area (3) Proposed Irrigated Area(24% of CCA) (4) Rate of Irrigated volume (9) Overall irrigation efficiency inclusive of conveyance efficiency of watercourse (10) Supplication efficiency inclusive of conveyance efficiency of watercourse (11) Field irrigation settimated based upon measurement and "Upper Ganges Project" and FAO Irrigation and Drainage Paper	at Head	77,814	10,747	18,675	58%	8	0.55	0.80	0.80	0.35			60%
 (1) Culturable commanded area (2) Actual irrigated area (3) Proposed Irrigated Area(24% of CCA) (4) Rate of AIA to PIA (5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse (6) Application area and volume were collected from Irrigation Department of UP Actual irrigation area and volume were collected from Irrigation Department of UP Irrigation area and volume were collected from Irrigation Department of UP Irrigation area and volume were collected from Irrigation Department of UP 	 (1) Culturable commanded area (2) Actual irrigated area (3) Proposed Irrigated Area(24% of CCA) (4) Rate of AIA to PIA (5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse (6) Application efficiency inclusive of conveyance efficiency of watercourse (7) Actual irrigation area and volume were collected from Irrigation Department of UP Irrigation efficiency was estimated based upon measurement and "Upper Ganges Project" and FAO Irrigation and Drain Ground Water Paradment of ID 	at 33 miles	31,465	3,327	7.552	44%	17	0.55	0.80	0.80	0.35			33%
(2) Actual intigated area (3) Proposed Intigated Area(24% of CCA) (4) Rate of Alt to PIA (5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse (6) Application area and volume were collected from Irrigation Department of UP Actual irrigation area and volume were collected from Irrigation Department of UP	(2) Actual intigated area (3) Proposed Irrigated Area(24% of CCA) (4) Rate of AIA to PIA (5) Actual supplied volume (5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse (6) Application area and volume were collected from Irrigation Department of UP Irrigation area and volume was estimated based upon measurement will Upper Ganges Project" and FAO Irrigation and Drain Fronted trates well believed has estimated based upon measurement by Ground Water Percept and FAO Irrigation and Drain Ground water avoid by the was estimated based upon measurement by Ground Water Department of 1D									Convevance	loss of Dist	nibutarv/M	inor	
 (3) Proposed Irrigated Area(24% of CCA) (4) Rate of AIA to PIA (5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse Actual irrigation area and volume were collected from Irrigation Department of UP Irrigation efficiency was estimated based upon measurement and "Upper Ganees Project" and FAO Irrigation and Drain 	(3) Proposed Irrigated Area(24% of CCA) (4) Rate of AIA to PIA (5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse (6) Application area and volume were collected from Irrigation Department of UP Irrigation area sestimated based upon measurement and "Upper Ganges Project" and FAO Irrigation and Drain Irrigation efficiency was estimated based upon measurement by Ground Water Department of TD Ground grater avoidability was estimated based upon Reports by Ground Water Department of TD								6	Jonveyano	loss of Mai	n/Branch		
 (4) Rate of AIA to PIA (5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse Actual irrigation area and volume were collected from Irrigation Department of UP Irrigation area setimated based upon measurement and "Upper Ganees Project" and FAO Irrigation and Drain 	 (4) Rate of AIA to PIA (5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse Actual irrigation area and volume were collected from Irrigation Department of UP Irrigation efficiency was estimated based upon measurement and "Upper Ganges Project" and FAO Irrigation and Drain Ground gaster availability was estimated based upon Reports by Ground Water Department of TD 	(3) Proposed Irrigated Area(24%	of CCA)						€ €	Overall ims	zation efficie	auc.v		
 (5) Actual supplied volume. (6) Application efficiency inclusive of conveyance efficiency of watercourse. Actual irrigation area and volume were collected from Irrigation Department of UP. Irrigation efficiency was estimated based upon measurement and "Upper Ganees Project" and FAO Irrigation and Drain 	(5) Actual supplied volume. (6) Application efficiency inclusive of conveyance efficiency of watercourse Actual irrigation area and volume were collected from Irrigation Department of UP Irrigation efficiency was estimated based upon measurement and "Upper Ganges Project" and FAO Irrigation and Drain Ground gaster avoidability was estimated based upon measurement by Ground Water Department of 110	(4) Rate of AIA to PIA							(0)	Supplied vo	lume to farm	nland		
(6) Application efficiency inclusive of conveyance efficiency of watercourse Actual irrigation area and volume were collected from Irrigation Department of UP Irrigation efficiency was estimated based upon measurement and "Upper Ganees Project" and FAO Irrigation and Drain	(6) Application efficiency inclusive of conveyance efficiency of watercourse Actual irrigation area and volume were collected from Irrigation Department of UP Irrigation efficiency was estimated based upon measurement and "Upper Ganges Project" and FAO Irrigation and Drain Ground gaster avoidability was estimated based upon Reported by Ground Water Department of TD	(5) Actual supplied volume		; ;		٠.			(11) E	reld imgat	ion requiren	rents		
	•	(6) Application efficiency inclusive	ve of conveyand	se efficiency of	watercours	စ္တ			(12) I	mgation su	iffency to co	rop water re	equirements	
	٠		vere collected fro	Tuestion I	Spartment	ofine								
	Comment costs and installed based come Benearts by Grant Water Parattement of ITP		pased upon mea	surement and "	Upper Gan	ges Project"	and FAO Irris	zation and I	Srainage F	aper	ē			

Rabi Water Distribution under Present Condition (2/2) Table A.16

Came System Code ALA PLA PLA AST PAR AST PARE CONES CO	System CCA ALA PLA ALAPA ANY FAPE CONES CONES OLG FOOD ACCOS GROWN CONTRINENCE	Canal System harda Main Canal at Head at Bifurcation Theri Branch Canal at Head at Head at 23 miles at 23 miles Lucknow Branch Canal (55 miles at 99 miles	CCA (1) (ha)	AIA (2)	:	AIA/PIA (4)	ASV	FAP.E	日に	CONE	OVLE	FSV	FIR	SI
(4) (2) (3) (4) (5) (6) (5) (6) (7) (8) (9) (10) (11) (12) (12) (12) (12) (12) (12) (12	(1) (2) (3) (4) (5) (4) (5) (5) (6) (7) (8) (9) (7) (10) (11) (12) (12) (12) (12) (12) (12) (12	iharda Main Canai at Head at Bifurcation Cheri Branch Canal at Head at 23 miles at 53 miles at 99 miles Asiwan Branch Canai (55 mile	(1) (ha)	G (£	<u> </u>	€	Ç		į			6		!
1,512,033 339,432 403,138 82% 2,9% 0,47 0,80 0,65 0,75 0,28 554 911 1,512,080,886 (228,244) 270,222 54% 1,9% 0,47 0,80 0,75 0,28 554 911 2,33,114 (56,034) 80,779 188,443 86,78 1,345 0,47 0,80 0,75 0,28 554 911 2,33,114 (56,034) 80,779 18,749 24,399 77% 1,159 86% 1,9% 0,47 0,80 0,80 0,30 0,30 1,10 2,54 3,144 (5,244) 77,159 86% 1,9% 0,47 0,80 0,88 0,32 1,10 2,54 3,144 (5,247) 18,749 24,399 77% 1,35 0,47 0,80 0,85 0,32 49 75 3,145 1,4778 1,7637 1,7637 1,7918 96% 77% 0,47 0,80 0,85 0,32 2,2 5 3,145 1,4778 1,5423 2,1378 77% 66% 1,70 0,47 0,80 0,85 0,32 2,2 5 3,145 1,4778 1,5423 2,1378 77% 66% 1,70 0,47 0,80 0,85 0,32 2,2 5 3,145 1,4778 1,7637 1,763	1,612,633 329,432 458,138 82% 2,880 0.47 0.89 0.65 0.55 0.75 1,415 1,415 1,1280,886 (228,246) 777,222 84% 1,966 0.47 0.89 0.75 0.28 554 911 2,57 1,522,99 188,448 86,78 1,245 0.47 0.89 0.75 0.28 379 654 2,57 2,523,99 188,448 1,524 87% 1,524 96,78 1,545 0.47 0.89 0.75 0.28 379 654 2,	harda Main Canai at Head at Bifurcation Cheri Branch Canal lardoi Branch Canal at Head at 23 miles at 53 miles Lucknow Branch Canai (55 mile at 99 miles		(BID)	(ha)	`&)	(MCM)	G	E	©	6	MCM)	(1) (2) (2) (3)	£ £ £
1, 150, 150, 150, 150, 150, 150, 150, 15	1,615,234 235,422 445,135 445 246 247 0.80 0.65 0.55 0.54 1415	at Head at Bifurcation Cheri Branch Canal Aardoi Branch Canal at Head at 23 miles at 53 miles Lucknow Branch Canal (55 miles at 99 miles										•		
1,000,886 2,282,49 2,70,222 84% 1,906 047 080 075 0.28 554 911	1,000,0886 1,0	at Bifurcation Cheri Branch Canal Jardoi Branch Canal at Head at 23 miles at 53 miles Lucknow Branch Canal (55 mile at 99 miles	1,612,633	329,422	403,158	82%	2,982	0.47	0.80	0.69	0.26	77.5	1,415	55%
323,114 (66.044) 80,779 82% 561 0.47 0.89 0.75 0.28 157 257 257 257 257 257 257 257 257 257 2	325,114 (66.044) 80,779 82% 561 0.47 0.89 0.75 0.28 157 257 T22,359 188,440 86% 1345 0.47 0.80 0.75 0.28 157 257 T22,359 188,471 81,420 88% 1345 0.47 0.80 0.75 0.29 396 654 0.47 0.80 0.75 0.29 366 0.59 0.75 0.29 366 0.59 0.75 0.29 366 0.59 0.75 0.29 366 0.59 0.75 0.29 366 0.59 0.75 0.29 0.75 0.29 366 0.59 0.75 0.29 0.59 0.75 0.29 366 0.59 0.75 0.29 0.75 0.29 0.75 0.29 0.75 0.29 0.75 0.29 0.75 0.29 0.75 0.29 0.75 0.29 0.75 0.29 0.75 0.29 0.75 0.29 0.75 0.29 0.75 0.29 0.75 0.29 0.75 0.29 0.75 0.29 0.75 0.29 0.75 0.29 0.75 0.75 0.75 0.75 0.75 0.75 0.75 0.75	Cheri Branch Canal lardoi Branch Canal at Head at 23 miles at 53 miles Lucknow Branch Canal (55 mile at 99 miles	1,080,886	(228,243)	270,222	84%	1,906	0.47	0.80	0.75	0.28	534	911	299
757,772 162,259 189,443 86% 1,245 0,47 0,80 0,75 0,28 379 654 752,599 145,756 167,224 87% 952 0,47 0,80 0,78 0,29 369 656 6668,893 145,756 167,224 87% 952 0,47 0,80 0,80 0,30 0,30 2,89 572 Cornal (55 miles) 308,771 65,419 77,159 88% 1,225 0,47 0,80 0,88 0,32 0,32 69 572 And (50 miles) 281,443 62,806 70,261 89% 364 0,47 0,80 0,88 0,32 69 126 And (50 miles) 71,672 17,673 17,918 98% 125 0,47 0,80 0,85 0,32 67 77 And (50 miles) 281,445 14,718 19,452 77% 68 0,47 0,80 0,85 0,32 77 77 And (50 miles) 32,658 7,677 8,164 96% 125 0,47 0,80 0,85 0,32 67 18 And (50 miles) 32,658 7,677 8,169 96% 125 0,47 0,80 0,85 0,32 67 18 And (50 miles) 32,658 7,677 8,169 96% 125 0,47 0,80 0,85 0,32 67 18 And (50 miles) 32,658 7,677 8,169 96% 125 0,47 0,80 0,85 0,32 67 18 And (17) But And (17) Bu	757,772 162,239 188,443 88% 1,345 0,47 0,80 0,75 0,28 379 654 1,255 162,239 188,443 88% 1,226 0,47 0,80 0,78 0,29 380 656 65	andon branch Canal at Head at 23 miles at 53 miles at 59 miles at 99 miles	323,114	(66,004)	80,779	82%	561	0.47	0.80	0.75	0.28	157	257	61%
737.77 1 (26.229) 188443 88% 1145 0.47 0.80 0.75 0.28 379 654 Canal (55 miles) 308.771 65419 77159 85% 124 0.47 0.80 0.78 0.23 369 572 And (50 miles) 308.771 65419 77159 85% 159 0.47 0.80 0.85 0.32 63 126 And (50 miles) 308.771 1 (55419 77159 85% 159 0.47 0.80 0.85 0.32 63 126 And (50 miles) 308.771 1 (55419 77159 85% 159 0.47 0.80 0.85 0.32 63 126 And (50 miles) 37.570 18749 24.373 77% 135 0.47 0.80 0.85 0.32 49 775 And (50 miles) 37.665 17.597 17.591 8584 86% 124 0.47 0.80 0.85 0.32 27 70 And (50 miles) 37.665 0.678 17.591 8584 86% 124 0.47 0.80 0.85 0.32 27 70 And (50 miles) 37.665 0.678 17.591 8584 86% 124 0.47 0.80 0.85 0.32 27 70 And (50 miles) 37.665 0.678 17.591 8584 86% 124 0.47 0.80 0.85 0.32 27 70 And (50 miles) 37.665 0.678 17.591 8584 86% 124 0.47 0.80 0.85 0.32 25 35 And (50 miles) 37.665 0.678 17.591 0.47 0.80 0.85 0.32 25 35 And (50 miles) 37.665 0.678 17.5 0.47 0.80 0.85 0.32 25 35 And (178 miles date are an experiment of the finite formula and or differency of watercourse of soft of the plant and or differency of watercourse of the finite f	737,772 18,457 18,454 18,454 18,457	at Head at 23 miles at 53 miles at 59 miles at 99 miles				į							į	-
Canal (55 miles) 668,895 188,567 180,900 88% 1,226 0,47 0.80 0.78 0.29 360 636	Table 9 188-567 180,900 88% 1,226 0,47 0,80 0,78 0,29 360 656 Control (35 miles) 398,71 65,419 771,99 85% 1,957 0,47 0,80 0,88 0,13 116 254 126 At Canal (35 miles) 398,71 65,419 771,99 85% 157 0,47 0,80 0,88 0,13 116 254 126 At Canal (35 miles) 281,449 62,806 70,361 89% 364 0,47 0,80 0,88 0,32 130 126 126 At Canal (35 miles) 97,570 187,49 24,399 77% 135 0,47 0,80 0,85 0,32 40 69 30 69 65 17,570 187,49 14,718 19.45 7.67 14,40 14,	at 23 miles at 53 miles Lucknow Branch Canal (55 mile at 99 miles	757,772	162,239	189,443	%98 86%	1,345	0.47	80	0.75	0.28	379	\$	88
Const (55 miles) 668,895 145,756 167,224 87% 962 0.47 0.80 0.80 0.30 2.89 572	Canal (55 miles) G68,895 145,756 167,224 87% 962 0.47 0.80 0.80 0.30 2.89 572	at 53 miles Lucknow Branch Canal (55 mile at 99 miles Asiwan Branch Canal	723,599	158,567	180,900	88%	1,226	0.47	0.80	0.78	0.29	360	936	579
Carnal (55 miles) 308,771 65,419 77,193 85% 372 0,47 0.80 0.83 0.31 116 254 Alth Orpha 22,550 38,095 86% 198 0.47 0.80 0.85 0.32 63 126 Alth Orpha 22,816 70,361 89% 364 0.47 0.80 0.80 0.30 110 2.50 Alth Orpha 24,365 17,918 98% 86 0.47 0.80 0.85 0.32 43 75 Alth Orpha 24,565 17,922 18,641 96% 175 0.47 0.80 0.85 0.32 23 57 Alth Orpha 24,663 7,866 60% 17 0.47 0.80 0.85 0.32 23 57 Alth Orpha 24,663 7,866 60% 17 0.47 0.80 0.85 0.32 23 57 Alth Orpha 24,663 7,866 60% 17 0.47 0.80 0.85 0.32 23 57 Alth Orpha 24,663 7,866 60% 17 0.47 0.80 0.85 0.32 23 57 Alth Orpha 24,663 7,866 60% 17 0.47 0.80 0.85 0.32 23 57 Alth Orpha 24,663 7,866 60% 17 0.47 0.80 0.85 0.32 23 57 Alth Orpha 24,663 7,866 60% 17 0.47 0.80 0.85 0.32 23 57 Alth Orpha 24,663 7,866 60% 17 0.47 0.80 0.85 0.32 23 57 Alth Orpha 24,663 7,866 60% 17 0.47 0.80 0.85 0.32 23 57 Alth Orpha 24,663 24,663 24,663 24,665 2	Carnel (55 miles) 398,771 65,419 77,193 85% 372 0.47 0.80 0.85 0.31 116 254	Lucknow Branch Canal (55 mile at 99 miles		145,756	167,224	%1.8	962	0.47	0.80	0.80	0.30	583	572	519
308,771 65,419 77,193 85% 372 0,47 0,80 0,83 0,31 116 254 th Canal 152,379 32,650 38,095 86% 198 0,47 0,80 0,85 0,32 63 126 anal (50 miles) 97,570 18,749 24,399 77% 135 0,47 0,80 0,85 0,32 43 75 T1,672 17,637 17,918 98% 86 0,47 0,80 0,85 0,32 43 75 able commanded area 17,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 Aft At A D PLA supplied vedimes supplied vedimes 4,50 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 T7,814 14,718 14,7	308,771 65,419 77,153 85% 572 0,47 0.80 0.83 0.31 116 234 1152,379 32,650 38,095 86% 198 0,47 0.80 0.85 0.32 63 126 Anal (50 miles) 97,570 18,749 24,399 77% 135 0,47 0.80 0.85 0.32 43 75 281,443 62,806 70,261 89% 364 0,47 0.80 0.80 0.30 110 250 Anal (50 miles) 97,570 18,749 24,399 77% 135 0,47 0.80 0.85 0.32 43 75 285,511 16,423 21,378 77% 68 0,47 0.80 0.85 0.32 23 58 31,465 4,683 7,877 8,140 9,4% 77 0.47 0.80 0.85 0.32 23 58 31,465 4,683 7,864 60% 17 0.47 0.80 0.85 0.32 23 58 31,465 4,683 7,865 60% 17 0.47 0.80 0.85 0.32 23 58 31,465 4,683 7,865 60% 17 0.47 0.80 0.85 0.32 23 58 31,465 4,683 7,865 60% 17 0.47 0.80 0.85 0.32 23 58 31,465 4,683 7,865 60% 17 0.47 0.80 0.85 0.32 23 58 31,465 4,683 7,865 60% 17 0.47 0.80 0.85 0.32 23 58 31,465 4,683 7,865 60% 17 0.47 0.80 0.85 0.32 23 58 31,465 4,683 7,865 60% 17 0.47 0.80 0.85 0.32 23 58 31,465 4,683 7,865 60% 17 0.47 0.80 0.85 0.32 23 58 31,465 4,683 7,865 60% 17 0.47 0.80 0.85 0.32 23 58 31,465 4,683 7,865 60% 17 0.47 0.80 0.85 0.32 23 58 31,465 4,683 7,865 60% 17 0.47 0.80 0.85 0.32 23 58 31,465 4,683 7,865 60% 17 0.47 0.80 0.85 0.32 23 58 31,465 4,683 7,865 60% 17 0.47 0.80 0.85 0.32 23 58 31,465 4,683 7,865 60% 17 0.47 0.80 0.85 0.32 23 58 31,465 4,683 7,865 60% 17 0.47 0.80 0.85 0.32 23 58 31,465 4,683 7,865 60% 17 0.47 0.80 0.85 0.85 0.32 23 58 31,465 4,683 7,865 60% 17 0.47 0.80 0.85 0.85 0.32 23 58 31,465 8,685 0.24 0.24 0.24 0.24 0.24 0.24 0.24 0.24	at 99 miles												
ath Canal (30 miles)	at th Canati th Canati th Canati th Canati th Canati (50 miles) 281,443 62,806 70,361 89% 364 0.47 0.80 0.85 0.32 63 126 126 2014	Aeiwan Branch Canal	308,771	65,419	77, 193	85%	372	0.47	080	9.8	0.31	116	25 25	46%
152,379 32,650 38,095 86% 198 0,47 0,80 0,85 0,32 63 126 Anal (30 miles) 281,443 62,806 70,361 89% 364 0,47 0,80 0,80 0,30 110 2.50 Anal (50 miles) 71,672 17,637 17,918 98% 86 0,47 0,80 0,85 0,32 43 75 85,511 16,423 21,378 77% 68 0,47 0,80 0,85 0,32 27 70 77,814 14,718 19,454 76% 73 0,47 0,80 0,85 0,32 23 57 77,814 10,214 18,4718 19,454 76% 73 0,47 0,80 0,85 0,32 23 57 77,814 to P.A. supplied ocumanded area supplied area (10) Supplied area (11) Field ingration requirements such area are area are area are area are are	152,379 32,650 38,095 86% 198 0,47 0,80 0,85 0,32 63 126 Anal (50 miles) 281,443 62,806 70,361 89% 364 0,47 0,80 0,80 0,30 110 250 Anal (50 miles) 71,570 18,749 24,399 77% 135 0,47 0,80 0,85 0,32 43 75 85.511 16,423 21,378 77% 68 0,47 0,80 0,85 0,32 49 75 46,685 17,591 8,160 9,49 72 0,47 0,80 0,85 0,32 23 57 77,814 14,718 19,454 76% 72 0,47 0,80 0,85 0,32 23 57 77,814 14,718 19,454 76% 72 0,47 0,80 0,85 0,32 23 57 77,814 14,718 19,454 76% 72 0,47 0,80 0,85 0,32 23 57 77,814 14,718 19,454 76% 72 0,47 0,80 0,85 0,32 23 57 77,814 14,718 19,454 76% 72 0,47 0,80 0,85 0,32 23 57 83,465 4,685 7,866 60% 77 0,47 0,80 0,85 0,32 23 57 77,814 14,718 19,454 76% 72 0,47 0,80 0,85 0,32 23 57 83,609 7,800 0	שמוויאין זייינייייייי אינויייייי אינוייייייי												
### State of Care and Expension Parameter a conveyance of Fitzeer of Care and Values are and values are and values and an area and values on conveyance of Fitzeer of Care and values are	281,443 62,806 70,361 89% 364 0,47 0,80 0,80 0,30 110 250 and (50 miles) 71,570 18,749 24,399 77% 135 0,47 0,80 0,85 0,32 43 75 70 11,572 17,518 8,180 9,4% 72 0,47 0,80 0,85 0,32 22 63 18,641 8,641 8,642 17,647 8,180 9,4% 72 0,47 0,80 0,85 0,32 22 63 18,641 8,641 8,642 17,647 8,180 9,4% 72 0,47 0,80 0,85 0,32 23 57 18,641 8,140 9,14	at Tail	152,379	32,650	38,095	%98 8	198	0.47	0.80	0.85	0.32	B	126	50%
281,443 62,806 70,361 89% 3-64 0,47 0,80 0,80 0,30 110 2.50 (2.50 miles) 97,570 18,749 24,393 77% 135 0,47 0,80 0,85 0,32 43 75 75 17,672 17,637 17,918 98% 8-6 0,47 0,80 0,85 0,32 42 77 70 (2.50 miles) 92,638 7,677 8,100 94% 75 0,47 0,80 0,85 0,32 40 69 18,641 9,645 75 0,47 0,80 0,85 0,32 40 69 18,641 14,718 19,454 76% 77 0,47 0,80 0,85 0,32 2 3 57 18,641 9,683 7,865 0,047 0,80 0,85 0,32 2 3 57 18,641 0,945 0,047 0,47 0,80 0,85 0,32 2 3 57 18,641 0,945 0,047 0,47 0,80 0,85 0,32 2 3 57 18,641 0,945 0,047 0,47 0,80 0,85 0,32 2 3 57 18,641 0,945 0,047 0,47 0,80 0,85 0,32 2 3 57 18,641 0,945 0,047 0,47 0,80 0,85 0,32 2 3 57 18,641 0,945 0,047 0,47 0,47 0,80 0,85 0,32 2 3 57 18,641 0,945 0,047 0,47 0,47 0,80 0,85 0,32 2 3 57 18,641 0,945 0,047 0,47 0,47 0,47 0,47 0,47 0,47 0,4	281,443 62,806 70,361 89% 364 0.47 0.80 0.80 0.30 110 2.50 2.50 2.50 2.50 2.50 2.50 2.50 2.5	Purwa, Unnao Branch Canai				-								
281,443 6,2,806 70,361 89% 364 0.47 0.80 0.80 0.30 110 250 Figure 1	281,443 62,806 70,361 89% 364 0,47 0,80 0,80 0,30 110 250 281,445 24,393 77% 135 0,47 0,80 0,85 0,32 43 75 71,672 17,672 17,637 17,918 98% 86 0,47 0,80 0,85 0,32 49 75 85,511 16,423 21,378 77% 68 0,47 0,80 0,85 0,32 22 63 24,685 17,802 18,641 96% 125 0,47 0,80 0,85 0,32 40 69 25,638 1,465 1,4718 19,454 76% 77 0,47 0,80 0,85 0,32 23 57 31,465 4,683 7,866 6,6% 17 0,47 0,80 0,85 0,32 23 57 31,465 0,483 1,465 1,4718 19,454 6,6% 17 0,47 0,80 0,85 0,32 23 57 31,465 0,483 1,465 1,4718 1	ucknow Branch Canal												
Canal (50 miles) 97,570 18,749 24,593 77% 18,641 98% 86, 0,47 0,80 0,85 0,32 43 75 70 17,918 98% 86, 0,47 0,80 0,85 0,32 27 70 17,918 19,454 76% 17,000 17,000vegance loss of MaintBranch of Ith soul ments on learned from litisation Persaftnent of Ith soul ments on learned from litisation Department of Ith soul ments on learned from litisation Department of Ith soul ments on learned from litisation Department of Ith soul ments of Ith soul men	Canal (50 miles) 71,570 18,749 24,399 777 17,918 85,511 16,423 21,378 777 86 0,47 080 0,85 0,32 27 70 17,918 19,454 778 1778 17814 14,718 19,454 778 17814 14,718 19,454 778 17814 17	at Head	281.443	62.806	70.361	89%	364	0.47	080	0.80	0.30	110	250	44%
97,570 18,749 24,393 77% 135 0.47 0.80 0.85 0.32 43 75 71,672 17,637 17,918 98% 86 0.47 0.80 0.85 0.32 27 70 85,511 16,423 21,378 77% 68 0.47 0.80 0.85 0.32 27 70 74,565 17,532 18,641 96% 125 0.47 0.80 0.85 0.32 23 30 32,638 7,677 8,160 94% 77 0.47 0.80 0.85 0.32 23 30 11ingated area osed Irrigated Area(25% of CCA) 131,465 4,683 7,866 60% 17 0.47 0.80 0.85 0.32 23 57 131,465 0.000 0.0000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.00000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.000	97,570 18,749 24,393 77% 135 0,47 0.80 0.85 0.32 49 75 71,672 17,637 17,918 98% 86 0,47 0.80 0.85 0.32 77 70 85,511 16,423 21,378 77% 68 0,47 0.80 0.85 0.32 27 70 74,565 17,592 18,641 56% 125 0,47 0.80 0.85 0.32 40 69 32,638 7,678 8,160 5,4% 70 0,47 0.80 0.85 0.32 23 50 31,465 4,683 7,866 60% 17 0,47 0.80 0.85 0.32 23 57 31,465 A1 0,01	Sandila Branch Canal (50 miles)				: :	•	;	5	}				
11,672 17,637 17,918 58% 86 0.47 0.80 0.85 0.32 27 70 70 70 74,565 17,932 18,641 96% 125 0.47 0.80 0.85 0.32 23 30 77,814 14,718 19,454 76% 73 0.47 0.80 0.85 0.32 23 37 77 7814 14,718 19,454 76% 73 0.47 0.80 0.85 0.32 23 37 77 7814 14,718 19,454 76% 73 0.47 0.80 0.85 0.32 23 57 78 18 19,454 76% 73 0.47 0.80 0.85 0.32 23 57 78 18 19,454 76% 73 0.47 0.80 0.85 0.32 23 57 78 18 19,454 76% 73 0.47 0.80 0.85 0.32 23 57 78 18 19,454 76% 73 0.47 0.80 0.85 0.32 23 57 78 78 78 78 78 78 78	71,672 17,637 17,918 58% 86 0,47 0.80 0.85 0.32 27 70	at 72 miles		18,749	24,393	777%	135	0.47	0.80	0.85	0.32	43	75	58%
71,672 17,637 17,918 98% 86 0.47 0.80 0.85 0.32 27 70 85,511 16,423 21,378 77% 68 0.47 0.80 0.85 0.32 22 63 74,565 17,932 18,641 96% 125 0.47 0.80 0.85 0.32 23 30 32,638 7,677 8,160 94% 73 0.47 0.80 0.85 0.32 23 30 77,814 14,718 19,454 76% 73 0.47 0.80 0.85 0.32 5 18 31,465 4,683 7,866 60% 17 0.47 0.80 0.85 0.32 5 18 al supplied area of Ala to Pl.A 14,718	11,672 17,637 17,918 98% 86 0,47 0.80 0.85 0.32 27 70 17,672 18,641 96% 125 0,47 0.80 0.85 0.32 22 63 17,932 18,641 96% 125 0,47 0.80 0.85 0.32 23 30 18,641 96% 125 0,47 0.80 0.85 0.32 23 30 18,641 96% 17,677 18,160 19,454 76% 73 0,47 0.80 0.85 0.32 23 30 24,683 14,455 19,454 76% 17 0,47 0.80 0.85 0.32 23 57 18,641 96% 17 0,47 0.80 0.85 0.32 23 57 18,641 96% 17 0.47 0.80 0.85 0.32 23 57 18,641 96% 17 0.47 0.80 0.85 0.32 23 57 18,641 96% 17 0.47 0.80 0.85 0.32 23 18 18,641 96% 17 0.47 0.80 0.85 0.32 23 18 18 18 18 18 18 18 1	andila Branch Canal												
85,511 16,423 21,378 77% 68 0.47 0.80 0.85 0.32 22 63 63 74,555 17,932 18,641 96% 125 0.47 0.80 0.85 0.32 23 30 32 32 33 32,638 7,677 8,160 94% 72 0.47 0.80 0.85 0.32 23 30 31,465 4,683 7,866 60% 17 0.47 0.80 0.85 0.32 23 57 31,465 of CCA) Or Ald to PIA all supplied virtualistic of conveyance efficiency of watercourse cash or white the same collected from Irrigation Denartment of 17P and 17P irrigation sufficiency to crop water requirements cash or white the same collected from Irrigation Denartment of 17P and 17P irrigation sufficiency to crop water requirements (12) irrigation sufficiency to crop water requirements	85,511 16,423 21,378 77% 68 0.47 0.80 0.85 0.32 22 63 74,565 17,932 18,641 96% 125 0.47 0.80 0.85 0.32 29 69 32,638 7,677 8,160 94% 72 0.47 0.80 0.85 0.32 23 30 77,814 14,718 19,454 76% 73 0.47 0.80 0.85 0.32 23 57 77,814 14,718 19,454 76% 73 0.47 0.80 0.85 0.32 23 57 8 in gated area of Ala to PIA a to	at Head	71,672	17,637	17,918	%86	8	0.47	0.80	0.85	0.32	73	8	36%
85,511 16,423 21,378 77% 68 0.47 0.80 0.85 0.32 22 63 74,565 17,592 18,641 96% 125 0.47 0.80 0.85 0.32 29 69 32,638 7,677 8,160 94% 72 0.47 0.80 0.85 0.32 23 30 17,814 14,718 19,454 76% 73 0.47 0.80 0.85 0.32 23 57 31,465 4,683 7,866 60% 17 0.47 0.80 0.85 0.32 23 57 31,465 4,683 7,866 60% 17 0.47 0.80 0.85 0.32 5 18 al initiated area al supplied area al supplied volume in finite of millar of watercourse citation efficiency of watercourse cash of volume were collected from trispation Department of 17P social migration suffrancy to crop water requirements (11) Field imgation suffrancy to crop water requirements (12) Irrigation suffrancy to crop water requirements	85.511 16,423 21,378 77% 68 0.47 0.80 0.85 0.32 22 63 74.565 17,532 18,641 96% 125 0.47 0.80 0.85 0.32 23 30 32.638 7,677 8,160 94% 72 0.47 0.80 0.85 0.32 23 30 T7.814 14,718 19,454 76% 73 0.47 0.80 0.85 0.32 5 18 31.465 4,683 7,866 60% 17 0.47 0.80 0.85 0.32 5 18 al irrigated area osed Irrigated Area (25% of CCA) al supplied volume area and volume were collected from Irrigation Department of UP elficiency was estimated based upon measurement and "Upper Ganges Project" and FAO Irrigation and Drainage Paper	siwan Branch Canal												
74,565 17,932 18,641 96% 125 0.47 0.80 0.85 0.32 40 69 32,638 7,677 8,160 94% 72 0.47 0.80 0.85 0.32 23 30 30 31,465 4,683 7,866 60% 17 0.47 0.80 0.85 0.32 23 57 18 19,454 76% 73 0.47 0.80 0.85 0.32 23 57 18 19,454 76% 17 0.47 0.80 0.85 0.32 5 18 18 19,465 0.47 0.80 0.85 0.32 5 18 18 19,454 10 14 14 14 18 19,454 10 14 14 14 14 14 14 14 14 14 14 14 14 14	74,565 17,932 18,641 96% 125 0.47 0.80 0.85 0.32 40 69 32,638 7,677 8,160 94% 72 0.47 0.80 0.85 0.32 40 69 30 32,638 7,677 8,160 94% 72 0.47 0.80 0.85 0.32 23 30 30 31,465 4,683 7,866 60% 17 0.47 0.80 0.85 0.32 5 18 31,465 0.00 0.85 0.32 5 18 0.47 0.80 0.85 0.32 0.32 0.32 0.32 0.32 0.32 0.32 0.32	at Head	85,511	16,423	21,378	777%	8	0.47	0.80	0.85	0.32	23	89	35%
74,565 17,932 18,641 96% 125 0.47 0.80 0.85 0.32 40 69 32 (3638 7,677 8,160 94% 72 0.47 0.80 0.85 0.32 23 30 30 31,465 4,683 7,866 60% 17 0.47 0.80 0.85 0.32 23 57 18 to PIA to PIA all supplied volume and supplied volume efficiency of watercourse site and volume were collected from Tribation Department of 13P	74,565 17,932 18,641 96% 125 0.47 0.80 0.85 0.32 40 69 30 32, 30	hrwa Branch Canal												
anch Canal anch Canal T7,814 14,718 19,454 76% 73 0.47 0.80 0.85 0.32 23 37 anch Canal anch Canal anch Canal (1) Culturable commanded area (2) Actual irrigated Area(25% of CCA) (3) Proposed Irrigated Area(25% of CCA) (4) Rate of AIA to PIA (5) Actual supplied volume (5) Actual supplied volume (6) Application efficiency of watercourse (6) Application and volume were collected from Irrigation Department of UP	anch Canal anch Canal d d 77,814	at Head	74,565	17,932	18,641	888	125	0.47	080	0.85	0.32	8	69	88
anch Canal anch Canal d 77,814	anch Canal anch Canal d 77,814 14,718 19,454 76% 77 080 0.85 0.32 23 57 18 (1) Culturable commanded area (2) Actual irrigated area (2) Actual supplied volume (3) Proposed Irrigation area and volume were collected from Irrigation Department of UP (4) Actual irrigation and Drainage Paper (5) Actual volume were collected from Irrigation Department of UP (10) Supplied volume were collected from Irrigation Department of UP (11) Field irrigation sufficiency to crop water requirements (5) Actual volume were collected from Irrigation Department of UP (6) Application of Crop water requirements (7) Conveyance loss of Distributary/Minor (8) Conveyance loss of Main/Branch (9) Overall irrigation requirements (10) Supplied volume to farmland (11) Field irrigation sufficiency to crop water requirements (12) Irrigation sufficiency to crop water requirements	at 30 miles	32,638	7,677	8,160	94%	72	0.47	0.80	0.85	0.32	ន	30	16
13,465 14,718 19,454 76% 73 0.47 0.80 0.85 0.32 23 57	inles 77,814 14,718 19,454 76% 73 0.47 0.80 0.85 0.32 23 57 ills 19,454 4.683 7,866 60% 17 0.47 0.80 0.85 0.32 23 57 18 (1) Culturable commanded area (2) Actual inrigated area (3) Proposed Irrigated Area(25% of CCA) (4) Rate of AIA to PIA (5) Actual supplied volume (5) Actual supplied volume efficiency of watercourse (5) Application efficiency inclusive of conveyance efficiency of watercourse (6) Application efficiency was estimated based upon measurement and "Upper Ganges Project" and FAO Irrigation and Drainage Paper	Junao Branch Canal												
(1) Culturable commanded area (2) Actual irrigated Area(25% of CCA) (3) Proposed Irrigated Area(25% of CCA) (4) Rate of AIA to PIA (5) Actual supplied volume (5) Actual supplied volume efficiency of watercourse (6) Application efficiency inclusive of conveyance efficiency of watercourse (7) Conveyance loss of Distributary/Minor (8) Conveyance loss of Main/Branch (9) Overall irrigation efficiency (10) Supplied volume to farmland (11) Field irrigation requirements (6) Application sufficiency to crop water requirements	(1) Culturable commanded area (2) Actual irrigated area (2) Actual irrigated area (3) Proposed Irrigated Area(25% of CCA) (3) Proposed Irrigation efficiency of watercourse (5) Actual supplied volume (5) Actual irrigation area and volume were collected from Irrigation Department of UP Irrigation efficiency was estimated based upon measurement and "Upper Ganges Project" and FAO Irrigation and Drainage Paper	at Head	77,814	14,718	19,454	26%	E	0 47	0.80	0.85	0.32	23	53	41%
 (1) Culturable commanded area (2) Actual intigated area (3) Proposed Intigated Area(25% of CCA) (4) Rate of AIA to PIA (5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse (7) Actual supplied volume were collected from Intigation Department of 17P 	 Culturable commanded area Actual irrigated area Proposed Irrigated Area(25% of CCA) Rate of AIA to PIA Actual supplied volume Application efficiency inclusive of conveyance efficiency of watercourse Actual irrigation area and volume were collected from Irrigation Department of UP Irrigation efficiency was estimated based upon measurement and "Upper Ganges Project" and FAO Irrigation and Drains 	at 33 miles	31,465	4,683	7,866	%09	17	0.47	080	0.85	0.32	5	81	30%
(6) Application efficiency inclusive of conveyance efficiency of watercourse A winal teneration area and volume were collected from Irripation Department of UP	(6) Application efficiency inclusive of conveyance efficiency of watercourse Actual impation area and volume were collected from Irrigation Department of UP Irrigation efficiency was estimated based upon measurement and "Upper Ganges Project" and FAO Irrigation and Drains		6 of C	,					688933	Conveyance Conveyance Overall irrig Supplied vol	loss of Distrations of Main ration efficient form ion requirement of the contract of the contr	ributary/Mi a/Branch ncy land ents	root.	
		(6) Application efficiency	y inclusive of conveyand	e efficiency of	watercourse				(12)	irngation su	ii rency to cr	op water re	quirements	
			volume were collected fr	om Irrigation L	Separtment o	f.g.								

A - 62

Water Distribution under Improved Condition by CAD Works and Wireless Communication System (1/2)- Kharif Table A.17

Sucham	ć	VIV	V.G	A I A /D! A	Kharif(1986 - 1990)		E 170	i NO	р 1970	1,907	Q E	91
לבווסופלה והפותם)	{€	୍ଷ ଓଡ଼ି	6	4)	(S)			(8)	(6)	(05)	Œ	(12)
	(ha)	(ha)	(ha)	(%)	(MCM)					(MCM)	MCM	(%)
Sharda Marn Canal	;	•		1						,		
at Head	1,612,633	301,365	387,032	78%	4,395	0.76	0.85	0 G	0.47	2,066	1,927	100%
at Bifurcation	1,080,886	(187,590)	259,413	72%	3,265	0.76	0.85	0.75	8 4	1.567	1,157	100%
Kheri Branch Canal	323,114	(60,383)	7.27	78%	960	0.76	0.85	0.75	0,48 84	(<u></u>	100%
Hardoi Branch Canal		:										
at Head	757,772	127,208	181,865	20%	2,305	0.76	0.85	0.75	0.48 84	1,117	7	100%
at 23 miles	723,599	123.008	173,664	71%	2,043	0.76	0.85	0.78	0.50	1,029	726	100%
at 53 miles	668,895	109,628	160,535	%89	1,696	0.76	0.85	0.80	0.52	876	635	100%
Lucknow Branch Canal (55 miles)				•								
at 99 miles	308,771	48,733	74,105	999	651	0.76	0.85	0.83	2, 2,	349	291	100%
Asiwan Branch Canal												
atTail	152,379	25,669	36,571	70%	265	0.76	0.85	0.85	0.55	145	137	100%
Purwa, Unnao Branch Canal												
Lucknow Branch Canal												
at Head	281,443	1361	67,546	67%	731	0.76	0.85	80	0.52	378	338	100%
Sandila Branch Canal (50 miles)	8	ŗ	5	E C	220	4	0	900	9	4	č	£00
at 12 miles	0/5/8	157.11	14.57	0/4/	97	, ,	0.62	(S)	50.0	£	χ,	100%
Sandila Branch Canal												
at Head	71,672	8,921	17,201	52%	法	0.76	0.85	0.85	0.55	%	47	2001
Asiwan Branch Canal											-	
at Head	85,511	11,535	20,523	56%	126	0.75	0.85	0.85	0.55	8	. 62	100%
Purwa Branch Canal												
at Head	74,565	14,922	17,896	83%	168	0.76	0.85	0.85	0.55	83	8	100%
at 30 miles	32,638	5,485	7,833	2001	8	0.76	0.85	0.85	0.55	47	53	100%
Unnao Branch Canal								٠.				
	77.814	10 747	18.675	280%	æ	0.76	88.0	0.85	0.55		15	939
2 33 miles	31.465	3.327	7.552	3 4 8	1 2	0.76	0.85	0.85	0.55	90	, <u>c</u>	80%
Remarks: (1) Culturable commanded area								Conveyance	Conveyance loss of Distributary/Minor	ribiitary/M	1	
								Company 2000	Conveyance loss of Moin/Bennah	Tableson years.	2	
(2) Populari III galed area	, C ()						9 6	Overall into	Conveyance loss of main of Overall importion efficiency	r Dialicii		-
(3) Froposed Imgaled Albeita (4)	(4))						5	Carpalist Control	Supplied volume to formland	ייייייייייייייייייייייייייייייייייייייי		
(4) Actual supplied volume			:					rield impat	(11) Field impation requirements	ents		
(5) Application efficiency inclusive of conveyance efficiency of watercourse	e of convevan	se efficiency o	f watercours	ą			(12)	Ingation su	(12) Impation sufficient to crop water requirements	op water re	quirements	
Source: Actual impation area and volume were collected from Impation Department of LTP	re collected fro	Trivation	Penantment	7.11 <u>P</u>				0		1		
	ased upon mea	surement and	"Upper Gans	es Project"	and FAO Imis	ration and I	Srainage I	Paper				
Ground uniter availability was estimated	thed based incom	based inco Reports by Ground Water Derartment of 17P	round Water	Persentine	10f11P		0	<u>.</u>				
CIOUNTA THE WINDWING THE TANKE	inch cape about	· Co or looking			;		-					

Rabi Table A.17 Improved Condition by CAD Works and Wireless Communication System (2/2)

1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	(1) (2) (2) (3) (4) (5) (5) (6) (7) (6) (7) (8) (7) (8) (7) (10) (10) (10) (10) (10) (10) (10) (10	Canal System	tem	ğ	AIA	PIA	AIA/PIA	ASV FAP.E CC	FAP.E	CONE	CONEI	OVI.E	FSV	H.	SI
1,512,633 329,422 403,138 82% 2,982 0.67 0.87 0.77 0.45 828 911 223,114 (56,004) 80,779 82% 1,906 0.67 0.87 0.77 0.45 828 911 223,114 (56,004) 80,779 82% 1,906 0.67 0.87 0.77 0.45 828 911 223,114 (56,004) 80,779 82% 1,906 0.67 0.87 0.87 0.77 0.45 828 911 223,114 (56,004) 80,779 82% 1,926 0.67 0.87 0.87 0.87 0.45 604 654 223,114 (56,004) 80,779 88% 1,226 0.67 0.87 0.87 0.82 0.48 400 577 anal anal Camal (55 miles) 1,52,379 38,005 38,005 88% 1,926 0.67 0.87 0.85 0.48 400 577 anal anal Camal (55 miles) 1,52,379 32,650 38,005 88% 1,98 0.67 0.87 0.85 0.80 0.49 1.26 anal Camal (56 miles) 1,52,379 32,650 38,005 88% 1,98 0.67 0.87 0.85 0.80 0.49 1.26 anal Camal (56 miles) 1,52,379 1,537 1,791 1,592 1,594 1,5	1612,633 329,422 403,138 82% 1,396 0.67 0.87 0.77 0.45 1.222 1,415 1,050,386 (226,243) 270,222 94% 1,396 0.67 0.87 0.77 0.45 82% 911 323,114 (66,004) 80,777 82% 1,396 0.67 0.87 0.77 0.45 82% 911 323,114 (66,004) 80,772 82% 1,296 0.67 0.87 0.77 0.45 82% 911 323,114 (66,004) 80,772 82% 1,226 0.67 0.87 0.77 0.45 82% 911 323,114 (66,004) 80,77 81,96 0.67 0.87 0.87 0.77 0.45 82% 911 323,114 (66,004) 80,77 81,96 0.67 0.87 0.87 0.87 0.45 0.45 0.57 324,425 (62,243) 77,132 89% 354 0.67 0.87 0.85 0.50 0.48 1.74 2.50 4 Canal (55 miles) 97,570 18,742 24,393 77% 135 0.67 0.87 0.85 0.50 0.45 1.74 2.50 5 Canal (55 miles) 97,570 18,742 16,423 17,75 1.841 1.4718 1.9444 1.4718 1.			(1) (ha)	(6) (9)	ලි දි	(4)	(S) (S)		6	89	6)	(E) (S)	£ 5	(12)
1,612,653 329,422 470,3158 85% 2,982 0.67 0.87 0.75 0.45 858 911 1,080,386 (2,282,436) 2,072,22 85% 1,945 0.67 0.87 0.77 0.45 888 911 3721,772 162,239 186,443 86% 1,245 0.67 0.87 0.77 0.45 6.44 6.54 1,723,792 1,82,570 1,82,590 88% 1,245 0.67 0.87 0.87 0.87 0.48 4.50 5.72 anal Chand (55 miles) 39,8,711 65,419 77,139 88% 1,245 0.67 0.87 0.87 0.87 0.87 0.87 0.50 1.94 2.54 anal Chand (55 miles) 39,8,711 65,419 77,139 88% 1,245 0.67 0.87 0.87 0.85 0.50 1.94 2.54 anal Chand (55 miles) 32,430 38,035 86% 1,39 0.67 0.87 0.87 0.85 0.50 1.94 2.54 anal Chand (55 miles) 32,430 31,455 32,430 31,455 32,430 31,455 32,430 31,455 32,430 31,455 32,430 31,455 32,430 31,455	1612,633 329,422 409,138 82% 2,982 0.67 (320,048) 270,122 84% 1,906 0.67 (320,048) 270,122 84% 1,906 0.67 (321,114 (66,024) 80,779 82,777 1,105 82% 1,345 0.67 (67,048) 182,772 162,239 188,443 86% 1,226 0.67 (67,048) 182,775 167,124 87% 962 0.67 (67,048) 182,779 182,475 167,124 87% 962 0.67 (67,048) 182,779 182,475 167,124 87% 962 0.67 (67,048) 182,770 187,	Sharda Main Canal													
1,000,086 (222,243) 270,222 84% 1360 067 087 077 0.45 888 911 200 047 087 077 0.45 888 911 200 047 087 077 0.45 888 911 200 047 087 077 0.45 888 911 200 047 087 077 0.45 844 202 227 227 227 227 227 227 227 227 227	1.080,886 (228,243) 270,222 84% 1,506 067 (232,114 (66,004) 80,779 82% 551 067 (67 (67 (67 (67 (67 (67 (67 (67 (67 (at Head		1,612,633	329,422	403,158	82%	2,982	0.67	0.87	0.73	0.43	1,282	1,415	91%
321,114 (66,004) 80,779 82% 514 067 087 0.77 0.45 22 257 257 723,259 189,448 86% 1245 0.67 0.87 0.77 0.45 654 654 654 654 654 654 654 654 654 6	322.114 (56.004) 80,779 82% 561 0.67 C C C C C C C C C C C C C C C C C C C	at Bifurcation		1,080,886	(228,243)	270,222	84%	1,906	0.67	0.87	0.77	0.45	828	911	33
T37,772 162,239 189,445 86% 1345 0.67 0.87 0.77 0.45 604 654 Ch Canal (55 miles) 668,85 165,724 87% 120 0.67 0.87 0.80 0.47 572 658 and an Canal (55 miles) 308,771 65419 77,192 85% 372 0.67 0.87 0.85 0.50 1.89 1.25 and an Canal (50 miles) 308,771 1.52 0.80 77% 175 0.57 0.87 0.85 0.50 1.89 1.25 b Canal (50 miles) 77,50 1.87,49 2.43,59 77% 1.25 0.67 0.87 0.85 0.50 0.48 1.74 2.50 b Canal (50 miles) 77,50 1.87,49 2.43,59 77% 1.25 0.67 0.87 0.85 0.50 0.48 1.74 2.50 b Canal (50 miles) 77,50 1.87,49 2.43,59 77% 1.25 0.67 0.87 0.85 0.50 0.50 0.50 0.50 b Canal (50 miles) 77,50 1.87,49 2.43,59 77% 1.25 0.67 0.87 0.85 0.50 0.50 0.50 0.50 0.50 b Canal (50 miles) 77,51 1.64,23 21,378 77% 0.67 0.87 0.85 0.50 0.50 0.50 0.50 0.50 0.50 0.50	ch Canal (55 miles) ch Canal (55 miles) ch Canal (55 miles) and and and and and and and an	Kheri Branch Canal		323,114	(66,004)	80,779	82%	561	0.67	0.87	0.77	0.45	252	257	98%
T37.77 1 16.5 41 18.9 45 18.9 4 18.9 45 18.9 4 18.9 45 18.9 4 18	Canal (55 miles)	Hardoi Branch Canal			:										-
723.559 18.8547 180,900 88% 1,226 0.67 0.87 0.87 0.89 0.47 572 656 Carial (55 miles) 668.895 145,756 167,224 87% 992 0.67 0.87 0.82 0.48 460 572 al 152.379 32.659 38.095 86% 198 0.67 0.87 0.85 0.50 184 224 al 152.379 32.659 38.095 86% 198 0.67 0.87 0.85 0.50 184 224 al 152.379 32.659 38.095 86% 198 0.67 0.87 0.85 0.50 174 250 The carial (50 miles) 97.570 18.749 24.393 77% 135 0.67 0.87 0.85 0.50 67 75 This is a second of the commanded area integered area This is a second of the commanded area supplied volume of Trigorous efficiency of watercourse sition area and volume were collected from Trigorious Department of UP	723,599 158,567 180,900 88% 1226 0,67 (Canal (55 miles) 308,771 65,419 77,139 85% 372 0,67 (ch Canal (50 miles) 308,771 65,419 77,139 85% 372 0,67 (Canal (50 miles) 308,771 65,419 77,139 85% 372 0,67 (Canal (50 miles) 97,570 18,749 24,393 77% 135 0,67 (Canal (50 miles) 97,570 18,749 24,393 77% 135 0,67 (Canal (50 miles) 97,570 18,749 24,393 77% 135 0,67 (Canal (50 miles) 97,570 18,749 24,393 77% 135 0,67 (Canal (50 miles) 97,570 18,749 24,393 77% 135 0,67 (Canal (50 miles) 97,570 18,749 24,393 77% 135 0,67 (Canal (50 miles) 97,570 18,749 24,393 77% 135 0,67 (Canal (50 miles) 97,570 18,749 24,393 77% 135 0,67 (Canal (50 miles) 97,570 18,749 11,7918 98% 86 0,67 (Canal (50 miles) 17,672 17,637 17,918 98% 86 0,67 (Canal (50 miles) 17,672 17,918 98% 86 0,67 (Canal (50 miles) 17,672 17,918 98% 86 0,67 (Canal (50 miles) 17,672 17,918 98% 86 0,67 (Canal (50 miles) 17,672 17,918 19,454 76% 77 0,67 (Canal (50 miles) 17,672 17,918 19,454 76% 77 0,67 (Canal (50 miles) 17,672 17,918 19,454 76% 77 0,67 (Canal (50 miles) 17,672 18,641 96% 125 0,67 (Canal (50 miles) 17,672 18,641 96% 125 0,67 (Canal Ingiated area 17,672 18,641 14,718 19,454 76% 77 0,67 (Canal Ingiated volume 16,672 18,641 14,718 19,454 76% 77 0,67 (Canal (10 miles) 17,672 18,641 14,718 19,454 76% 77 0,67 (Canal (10 miles) 17,672 18,641 14,718 19,454 76% 77 0,67 (Canal (10 miles) 17,672 18,641 14,718 19,454 76% 77 0,67 (Canal (10 miles) 18,641 14,718 19,454 76% 77 0,67 (Canal (10 miles) 18,641 14,718 19,454 76% 77 0,67 (Canal (10 miles) 18,641 14,718 19,454 76% 77 0,67 (Canal (10 miles) 18,641 14,718 19,454 76% 77 0,67 (Canal (10 miles) 18,641 14,718 19,454 76% 77 0,67 (Canal (10 miles) 18,641 14,718 19,454 76% 77 0,67 (Canal (10 miles) 18,641 14,718 19,454 76% 77 0,67 (Canal (10 miles) 18,641 14,718 19,454 76% 77 0,67 (Canal (10 miles) 18,641 14,718 19,454 76% 77 0,67 (Canal (10 miles) 18,641 14,718 19,454 76% 77 0,67 (Canal (10 miles) 18,641 14,718 19,454 76% 77 0,67 (Canal (10 miles) 18,641 14,718 18,641 14,718 18,641 18	at Head		757,772	162,239	189,443	86%	1,345	0.67	0.87	0.77	0.45	8	654	92%
Canal (55 miles)	Canal (55 miles) 308.771	at 23 miles		723,599	158,567	180,900	% 8 8	1,226	0.67	0.87	080	0.47	572	636	80%
Canal (55 miles) 308,771 65,419 77,199 85% 372 0,67 0.87 0.85 0.50 184 254 254 254 256 38,095 86% 198 0.67 0.87 0.85 0.50 98 126 126 251 251,443 62,806 70,361 89% 364 0.67 0.87 0.85 0.50 98 174 250 251 251 252 24,393 77% 135 0.67 0.87 0.85 0.50 34 251 252 24,393 77% 252 26,307 251 252	Canal (55 miles) 308,771 65,419 77,199 85% 372 0,67 0 al	at 53 miles		668,895	145,756	167,224	87%	962	0.67	0.87	0.82	0.48	8	572	80%
Annual (50 miles) 308,771 65,419 77,139 85% 372 067 087 085 0,50 194 254 254 26. Charles	308,771 65,419 771,193 85% 372 0.67 (c) checked area and region efficiency of watercourse arianse area and volume were collected from the gallon proper present and the commended area and one measurements of watercourse arianses in the convervance efficiency of watercourse arianses are and volume were collected from this gation Department of UP and the column and the comment of the convervance efficiency of watercourse arianses and the column and the co	Lucknow Branch C.	inal (55 miles)												
## 152,279	al 152,379 32,650 38,095 86% 198 0,67 of the Canal (50 miles) 281,443 62,806 70,361 89% 364 0,67 of the Canal (50 miles) 97,570 18,749 24,393 77% 135 0,67 of the Canal (50 miles) 71,672 17,637 17,918 98% 86 0,67 of the Canal (50 miles) 85,511 16,423 21,378 77% 68 0,67 of the Canal (50 miles) 74,565 17,932 18,641 96% 125 0,67 of the Canal (50 miles) 32,638 7,677 8,160 94% 75 0,67 of the Canal (50 miles) 77,814 14,718 19,454 76% 73 0,67 of the Canal (50 miles) 77,814 14,718 19,454 76% 73 0,67 of the Canal (70 miles) 8 supplied volume ation are and volume were collected from Imigation Department of UP ation are and volume were collected from Imigation Department of UP ation are serious to make and volume were collected from Imigation Department of UP ation are serious the miles and Thank (70 miles Proise).	at 99 miles		308,771	65,419	77,193	85%	372	0.67	0.87	0.85	0.50	18	25.	72%
152,379 32,635 38,095 86% 198 067 0.87 0.85 0.50 98 126 Annual (50 miles) 231,443 62,806 70,361 89% 364 0.67 0.87 0.82 0.48 174 2.50 Annual (50 miles) 71,672 17,673 18,641 86% 125 0.67 0.87 0.85 0.50 67 75 Annual (50 miles) 85,511 16,423 21,378 77% 68 0.67 0.87 0.85 0.50 87 0.8 Annual (50 miles) 86,511 16,423 21,378 77% 68 0.67 0.87 0.85 0.50 87 0.8 Annual (50 miles) 87,510 18,445 14,718 19,454 76% 72 0.67 0.87 0.85 0.50 8 18 Annual (50 miles) 88,511 16,423 19,454 76% 73 0.67 0.87 0.85 0.50 8 18 Annual (50 miles) 88,521 1 1,455 11,592 18,641 86% 75 0.67 0.87 0.85 0.50 8 18 Annual (50 miles) 88,511 16,423 19,454 76% 73 0.67 0.87 0.85 0.50 8 18 Annual (50 miles) 88,521 1 1,455 19,454 76% 73 0.67 0.87 0.85 0.50 8 18 Annual (50 miles) 88,521 1 1,532 18,641 86% 73 0.67 0.87 0.85 0.50 8 18 Annual (50 miles) 88,521 1 1,532 18,641 86% 75 0.67 0.87 0.85 0.50 8 18 Annual (50 miles) 88,521 1 1,532 18,641 86% 75 0.67 0.87 0.85 0.50 8 18 Annual (50 miles) 88,521 1 1,532 18,641 86% 75 0.67 0.87 0.85 0.50 8 18 Annual (50 miles) 88,521 1 1,532 18,641 86% 75 0.67 0.87 0.85 0.50 8 18 Annual (50 miles) 89,046 77 0.87 0.85 0.50 8 18 Annual (50 miles) 89,046 77 0.87 0.85 0.50 8 18 Annual (50 miles) 89,046 77 0.87 0.85 0.50 8 18 Annual (50 miles) 89,046 77 0.87 0.85 0.50 8 18 Annual (50 miles) 89,046 77 0.87 0.85 0.50 8 18 Annual (50 miles) 89,046 77 0.87 0.85 0.50 8 18 Annual (50 miles) 89,046 77 0.87 0.85 0.50 8 18 Annual (50 miles) 89,046 77 0.87 0.85 0.50 8 18 Annual (50 miles) 89,046 77 0.87 0.85 0.50 8 18 Annual (50 miles) 80,046 70 0.87 0.87 0.85 0.50 8 18 Annual (50 miles) 80,046 70 0.87 0.85 0.50 8 18 Annual (50 miles) 80,046 70 0.87 0.85 0.50 8 18 Annual (50 miles) 80,046 70 0.87 0.85 0.50 8 18 Annual (50 miles) 80,046 70 0.87 0.85 0.50 8 18 Annual (50 miles) 80,046 70 0.87 0.85 0.50 8 18 Annual (50 miles) 80,046 70 0.87 0.85 0.50 8 18 Annual (50 miles) 80,046 70 0.87 0.85 0.50 8 18 Annual (50 miles) 80,047 0.87 0.88 0.50 0.50 0.50 0.50 0.50 Annual (50 miles)	th Canal 152,379 32,650 38,095 86% 198 0.67 (2014) 281,443 62,806 70,361 89% 364 0.67 (2014) 281,443 62,806 70,361 89% 364 0.67 (2014) 71,570 18,749 24,393 77% 135 0.67 (2014) 85,511 16,423 21,378 77% 68 0.67 (2014) 74,565 17,932 18,641 96% 125 0.67 (2014) 77,814 14,718 19,454 76% 77 0.67 (2014) and Imgated Area (25% of CCA) 4 46.5 17,677 8,160 94% 77 0.67 (2014) Ala to PIA supplied volume ation are and volume were colliciency of watercourse and volume were collicient or mingation Department of UP	Asiwan Branch Canal													
Horanal (50 miles) 281,443 62,806 70,361 89% 364 0.57 0.87 0.82 0.48 174 250 250 250 miles) 97,570 18,749 24,393 77% 135 0.67 0.87 0.85 0.50 67 75 75 75 17,512 16,423 21,378 77% 68 0.67 0.87 0.85 0.50 62 69 32,638 7,677 8,160 94% 72 0.67 0.87 0.85 0.50 82 18 18 19,454 0.77 8,14 14,718 19,454 76% 73 0.67 0.87 0.85 0.50 82 18 18 18 19,454 0.72 0.67 0.87 0.85 0.50 82 18 18 18 19,454 0.72 0.67 0.87 0.85 0.50 82 18 18 18 19,454 0.72 0.67 0.87 0.85 0.50 82 18 18 18 19,454 0.72 0.67 0.87 0.85 0.50 82 18 18 18 19,454 0.72 0.67 0.87 0.85 0.50 82 18 18 18 18 18 18 18 18 18 18 18 18 18	ch Canal 281,443	at Tail		152,379	32,650	38,095	86%	198	0.67	0.87	0.85	0.50	88	126	78%
281,443 62,806 70,361 89% 364 0.67 0.87 0.82 0.48 174 250 281,443 62,806 70,361 89% 364 0.67 0.87 0.82 0.48 174 250 71,572 17,572 1,778 88 0.67 0.87 0.85 0.50 42 70 85,511 16,423 21,378 77% 68 0.67 0.87 0.85 0.50 34 69 17,814 14,718 19,454 76% 125 0.67 0.87 0.85 0.50 86 18 51,465 4,683 7,866 60% 17 0.67 0.87 0.85 0.50 86 18 51,465 4,683 7,866 60% 17 0.67 0.87 0.85 0.50 86 18 51,465 A,683 7,866 60% 17 0.67 0.87 0.85 0.50 86 18 51,465 A,683 7,866 60% 17 0.67 0.87 0.85 0.50 86 18 51,465 A,683 7,866 60% 17 0.67 0.87 0.85 0.50 86 18 51,465 A,683 7,866 60% 17 0.67 0.87 0.85 0.50 86 18 51,465 A,683 7,866 60% 17 0.67 0.87 0.85 0.50 86 18 51,465 A,683 7,866 60% 17 0.67 0.87 0.85 0.50 86 18 51,465 A,683 7,866 60% 17 0.67 0.87 0.85 0.50 86 18 51,465 A,683 7,866 60% 17 0.67 0.87 0.85 0.50 86 18 51,465 A,683 7,866 60% 17 0.67 0.87 0.85 0.50 86 18 51,465 A,683 7,866 60% 17 0.67 0.87 0.85 0.50 86 18 51,465 A,683 7,866 60% 17 0.67 0.87 0.85 0.50 86 18 51,465 A,683 7,866 60% 17 0.67 0.87 0.85 0.50 86 18 51,465 A,683 7,866 60% 17 0.67 0.87 0.85 0.50 86 18 51,465 A,683 7,886 60% 17 0.67 0.87 0.85 0.50 86 18 51,465 A,683 7,886 60% 17 0.67 0.87 0.85 0.50 86 18 51,465 A,683 7,886 60% 17 0.67 0.87 0.85 0.50 86 18 51,465 A,683 7,886 60% 17 0.67 0.87 0.85 0.50 0.50 86 18 51,465 A,683 7,886 60% 17 0.67 0.87 0.85 0.50 0.50 86 18 51,465 A,683 7,886 60% 17 0.67 0.87 0.85 0.50 0.50 86 18 51,465 A,683 7,886 60% 17 0.67 0.87 0.85 0.50 0.50 0.50 0.50 0.50 0.50 0.50	281,443 62,806 70,361 89% 364 0.67 (20 miles) 97,570 18,749 24,393 77% 135 0.67 (20 miles) 97,570 18,749 24,393 77% 135 0.67 (20 miles) 97,570 18,749 24,393 77% 88% 0.67 (20 miles) 97,571 17,637 17,918 98% 86 0.67 (20 miles) 98% 125 0.67 (20 mile	Purwa, Unnao Branch	Janal Janal												
281,443 62,806 70,361 89% 364 0.67 0.87 0.82 0.48 174 250 281,443 62,806 70,361 89% 364 0.67 0.87 0.85 0.48 174 250 71,572 11,572 17,518 58% 86 0.67 0.87 0.85 0.50 57 75 85,511 16,423 21,378 77% 68 0.67 0.87 0.85 0.50 34 63 24,565 17,532 18,641 56% 72 0.67 0.87 0.85 0.50 35 50 32,638 7,677 8,160 59% 72 0.67 0.87 0.85 0.50 35 50 31,465 14,718 19,454 76% 72 0.67 0.87 0.85 0.50 8 18 All to PTA. supplied area supplied Alrea(25% of CCA) 13,145 1 14,718 19,454 76% 73 0.67 0.87 0.85 0.50 8 18 All to PTA. supplied volume area collected from Irrigation Department of UP attingated area (3) Conveyance loss of Main/Emant (3) Supplied volume to farmland (3) Supplied volume to farmland (4) Supplied volume to farmland (5) Trigation Sufficiency of water courte	281,443 62,806 70,361 89% 364 0.67 0 24,393 77% 135 0.67 (Liteknow Branch Canal													
Canal (50 miles) 97,570 18,749 24,593 7776 155 067 087 085 0.50 67 75 778 155 067 087 085 0.50 42 70 778 14,562 17,518 8978 86 0,67 087 085 0,50 42 70 778 14,562 17,518 8978 86 0,67 0,87 0,88 0,50 34 69 32,638 7,677 8,160 9478 778 778 778 778 778 778 778 778 778	Canal (50 miles) 97,570 18,749 24,393 77% 135 0.67 (71,672 17,637 17,918 98% 86 0.67 (85,511 16,423 21,378 77% 68 0.67 (32,638 7,677 8,160 94% 72 0.67 (31,465 4,685 7,866 60% 17 0.67 (31,465 4,685 7,866 60% 17 0.67 (31,465 4,683 7,866 60% 17 0.67 (31,465 4,	at Head		281 443	508.69	70 361	200	364	0.67	5	8	0.48	177	6	2001
97,570 18,749 24,393 77% 135 0.67 0.87 0.85 0.50 67 75 T1,672 17,637 17,918 58% 86 0.67 0.87 0.85 0.50 42 70 85,511 16,423 21,378 77% 68 0.67 0.87 0.85 0.50 34 63 70 T4,565 17,592 18,641 56% 125 0.67 0.87 0.85 0.50 36 50 alirigated area a lairigated area and volume of oroneve, and or where collected from Irrigation Department of UP	97,570 18,749 24,393 77% 135 0.67 (71,672 17,637 17,918 98% 86 0.67 (85,511 16,423 21,378 77% 68 0.67 (32,638 7,677 8,160 94% 72 0.67 (31,465 4,683 7,866 60% 17 0.67 (31,465 4,683 7,886 60% 17	Sandila Branch Can	at (50 miles)	7,100	2001	1	3	}	ò	ò	300	P S	t / T	3	Ž
71,572 17,537 17,918 58% 86 0.67 0.87 0.85 0.50 42 70 85,511 16,423 21,378 77% 68 0.67 0.87 0.85 0.50 42 70 74,565 17,592 18,641 96% 1.25 0.67 0.87 0.85 0.50 62 69 32,638 7,677 8,160 94% 72 0.67 0.87 0.85 0.50 82 36 30 77,814 14,718 19,454 76% 73 0.67 0.87 0.85 0.50 8 18 11 ingated area 31,465 4,683 7,866 60% 17 0.67 0.87 0.85 0.50 8 18 31,465 A 683 7,866 60% 17 0.67 0.87 0.85 0.50 8 18 (3) Conveyance loss of Main/Branch	71,672 17,637 17,918 98% 86 0.67 (85,511 16,423 21,378 77% 68 0.67 (74,565 17,932 18,641 96% 125 0.67 (32,638 7,677 8,160 94% 72 0.67 (31,465 4,688 7,866 60% 17 0.67 (31,465 4,688 7,866 60% 17 0.67 (31,465 0.67 (31,465 0.67 (31,465 0.67 (31,465 0.68 (31,465 0.67 (31,465 0.68 (31,465	at 72 miles		97,570	18,749	24,393	777%	135	0.67	0.87	0.85	0.50	67	75	%68
85,511 16,423 21,378 77% 68 0.67 0.87 0.85 0.50 42 70 77 74,565 17,918 98% 125 0.67 0.87 0.85 0.50 34 63 70 74,565 17,912 18,641 96% 125 0.67 0.87 0.85 0.50 36 50 30 30 30 30 30 30 30 30 30 30 30 30 30	71,672 17,637 17,918 98% 86 0.67 (85,511 16,423 21,378 77% 68 0.67 (32,638 17,677 8,160 94% 125 0.67 (32,638 7,677 8,160 94% 72 0.67 (31,465 4,683 7,866 60% 17 0.67 (31,465 4,683 7,866 60% 17 0.67 (31,465 4,683 7,866 60% 17 0.67 (31,465 4,683 7,866 60% 17 0.67 (31,465 4,683 7,866 60% 17 0.67 (31,465 11,318 19,454 76% 73 0.67 (31,465 0.67 (31,465 11,318 19,454 76% 17 0.67 (31,465 11,318 19,454 16% 17 0.67 (31,465 11,318	Sandila Branch Canal													
85,511 16,423 21,378 77% 68 0.67 0.87 0.85 0.50 34 63 62 69 32,32,638 7,677 8,160 94% 72 0.67 0.87 0.85 0.50 36 30 30 31,465 4,683 7,866 60% 17 0.67 0.87 0.85 0.50 36 57 30 41,40 Plane are all supplied volume were collected from Irrigation Department of UP	85,511 16,423 21,378 77% 68 0.67 (74,565 17,932 18,641 96% 125 0.67 (32,638 7,677 8,160 94% 72 0.67 (31,465 4,683 7,866 60% 17 0.67 (31,465 4,683 7,886 60% 17 0.67 (31,465 4,683 7,886 60% 17 0.	at Head		71,672	17,637	17,918	%86	8 8	0.67	0.87	0.85	0.50	45	8	61%
85,511 16,423 21,378 77% 68 0.67 0.85 0.50 34 63 43 45 45 45 45 45 45 45 45 45 45 45 45 45	85,511 16,423 21,378 77% 68 0.67 (74,565 17,932 18,641 96% 125 0.67 (74,565 17,637 8,160 94% 72 0.67 (74,565 17,814 14,718 19,454 76% 73 0.67 (74,565 17,814 14,718 19,454 76% 73 0.67 (74,565 17,814 14,718 19,454 76% 73 0.67 (74,565 17,814 14,718 19,454 76% 73 0.67 (74,565 17,814 14,718 19,454 76% 73 0.67 (74,565 17,610 18,														
85,511 16,423 21,378 77% 68 0.67 0.87 0.85 0.50 34 63 74,565 17,932 18,641 96% 125 0.67 0.87 0.85 0.50 36 30 32,638 7,677 8,160 94% 72 0.67 0.87 0.85 0.50 36 30 31,465 4,683 7,866 60% 17 0.67 0.87 0.85 0.50 8 18 50sed Irrigated area all irrigated area cost Irrigated area cost Irrigated area (7) Conveyance loss of Distributary/Minor of Matercourse licenton efficiency of watercourse licenton efficiency of watercourse licenton area and volume were collected from Irrigation Department of UP	85,511 16,423 21,378 77% 68 0.67 0 74,565 17,932 18,641 96% 125 0.67 0 32,638 7,677 8,160 94% 72 0.67 0 31,465 4,683 7,866 60% 17 0.67 0 and irrigated area all irrigated area all irrigated Area(25% of CCA) all supplied volume is supplied volume were collected from Irrigation Department of UP	Asiwan Branch Canal													
74,565 17,932 18,641 96% 125 0.67 0.87 0.85 0.50 62 69 30 32,638 7,677 8,160 94% 72 0.67 0.87 0.85 0.50 36 30 30 30 31,465 4,683 7,866 60% 17 0.67 0.87 0.85 0.50 8 18 18 osed Irrigated area all irrigated Area(25% of CCA) 18 19,454 76% 73 0.67 0.87 0.85 0.50 8 18 18 osed Irrigated Area(25% of CCA) 19 Overall irrigation efficiency of watercourse fliciency of water requirements flick irrigation sufficiency to crop water requirements figation area and volume ware collected from Irrigation Department of UP	74,565 17,932 18,641 96% 125 0.67 (32,638 7,677 8,160 94% 72 0.67 (31,456 4,638 7,677 8,160 94% 72 0.67 (31,465 4,638 7,366 60% 17 0.67 (31,465 4,638 7,366 60% 17 0.67 (31,465 4,638 7,366 60% 17 0.67 (31,465 4) 14,638 7,366 60% 17 0.67 (31,465 4)	at Head		85,511	16,423	21,378	77%	88	0.67	0.87	0.85	0.S	%	8	X SX
74,565 17,932 18,641 96% 125 0.67 0.87 0.85 0.50 62 69 32,638 7,677 8,160 94% 72 0.67 0.87 0.85 0.50 85 30 30 30 30 30 30 30 30 30 30 30 30 30	74,565 17,932 18,641 96% 125 0.67 (32,638 7,677 8,160 94% 72 0.67 (31,465 4,683 7,866 60% 17 0.67 (31,465 4,683 7,866 60% 17 0.67 (31,465 4,683 0,946 76% 73 0.67 (31,465 4,683 0,946 0,067 (31,465 4,683 0,946 0,067 (31,465 60% 17 0.67 (31,465 60% 17 0.67 (31,465 60% 17 0.67 (31,465 60% 10	Purwa Branch Canal													
32,638 7,677 8,160 94% 72 0.67 0.87 0.85 0.50 36 30 30 31,465 31,465 32,468 34,683 3,866 56% 37 0.67 0.87 0.85 0.50 36 37 31,465	32,638 7,677 8,160 94% 72 0.67 ("T7,814 14,718 19,454 76% 73 0.67 ("T7,814 14,718 19,454 78 ("T7,814 14,718 19,454 78 ("T7,814 14,718 19,454 19,454 19,	at Head		74,565	17,932	18,641	%96 8	125	0.67	0.87	0.85	0.50	62	8	%68 ***
17,814 14,718 19,454 76% 73 0.67 0.85 0.50 36 57 31,465 4,683 7,866 60% 17 0.67 0.87 0.85 0.50 36 57 31,465 4,683 7,866 60% 17 0.67 0.85 0.50 36 57 31,465	urable commanded area 31.465 4.683 7.866 60% 17 0.67 (31.465 4.683 7.866 60% 17 0.67 (31.465 4.683 7.866 60% 17 0.67 (31.465 60% 17	at 30 miles		32,638	7,677	8,160	24%	72	0.67	0.87	0.85	0.50	36	30	100%
14,718 19,454 76% 73 0.67 0.85 0.50 36 57	urable commanded area 31,465 4,683 7,866 60% 17 0.67 0 18 19,454 76% 77 0.67 0 19,1454 78 10,17 1	Unnao Branch Canal													
(1) Culturable commanded area (2) Actual supplied volume were collected from Irrigation Department of UP	(1) Culturable commanded area (2) Actual irrigated area (3) Proposed Irrigated Area(25% of CCA) (4) Rate of AIA to PIA (5) Actual supplied volume (6) Application area and volume were collected from Irrigation Department of UP	at Wead		77.814	14.718	19,454	76%	73	0.67	680	0.85	Ç	'n	F	63%
(1) Culturable commanded area (2) Actual irrigated Area(25% of CCA) (3) Proposed Irrigated Area(25% of CCA) (4) Rate of AIA to PIA (5) Actual supplied volume were collected from Irrigation Department of UP	 (1) Culturable commanded area (2) Actual irrigated area (3) Proposed Irrigated Area(25% of CCA) (4) Rate of AIA to PIA (5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse (7) Actual irrigation area and volume were collected from Irrigation Department of UP (8) Actual irrigation area and evitance where collected from Irrigation Department of UP 	at 33 miles		31.465	4.683	7,866	60%	1.	0.67	8	0.85	G 6	2 00	000	46%
 (2) Actual irrigated area (3) Proposed Irrigated Area(25% of CCA) (4) Rate of AIA to PIA (5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse Actual irrigation area and volume were collected from Irrigation Department of UP 	 (2) Actual irrigated area (3) Proposed Irrigated Area(25% of CCA) (4) Rate of AIA to PIA (5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse Actual irrigation area and volume were collected from Irrigation Department of UP Training afficient, was serimated based incommessurement and "I Input Canages Project" and EAO Training and Department of the Contract of Projects and EAO Training and EAO Traini		e commanded area								Conveyance	loss of Distr	ibutary/Mi	l	
 (3) Proposed Inigated Area(25% of CCA) (4) Rate of AIA to PIA (5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse Actual inigation area and volume were collected from Inigation Department of UP 	 (3) Proposed Irrigated Area(25% of CCA) (4) Rate of AIA to PIA (5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse Actual irrigation area and volume were collected from Irrigation Department of UP Togethal irrigation area and volume were collected from Irrigation Department of UP Togethal irrigation area and volume were collected from Irrigation Department of UP 		gated area							` <u>@</u>	Conveyance	loss of Mair	/Branch	i	
 (4) Rate of AIA to PIA (5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse Actual irrigation area and volume were collected from Irrigation Department of UP 	 (4) Rate of AIA to PIA (5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse Actual irrigation area and volume were collected from Irrigation Department of UP Together of the integration area and volume were collected from Irrigation Department of UP 	(3) Proposed	Irrigated Area(25% of	(CCA)						<u> </u>	Overall irrig	ation efficier	ncy		
(5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse Actual irrigation area and volume were collected from Irrigation Department of UP	(5) Actual supplied volume (6) Application efficiency inclusive of conveyance efficiency of watercourse Actual imigation area and volume were collected from Irrigation Department of UP	(4) Rate of A	IA to PIA							(10)	Supplied vo	lume to farm	land		
(6) Application efficiency inclusive of conveyance efficiency of watercourse Actual irrigation area and volume were collected from Irrigation Department of UP	(6) Application efficiency inclusive of conveyance efficiency of watercourse Actual imigation area and volume were collected from Imigation Department of UP	(5) Actual su	pplied volume							(11)	Field imgat	ion requirem	ents		
		(6) Applicati	on efficiency inclusive	of conveyance	efficiency of	watercourse			-	(12)	Irrigation su	officency to cre	op water rec	quirements	
			in area and volume we	re collected fro	m Irrigation D	Repartment c	ŕCP								

- Kharif Water Distribution under Improved Condition and with Ground Water Development Rate of 35% (1/2) Table A.18

					.											
				Kharif(1986 - 1990)	_											
Canal System	ð:	PIA	AIA	ASV	<u>.</u>	ដ	CON.EI	OVI.E	FSV	GWV	FIR	SI		EIIA/AIA	ETIA	ETIAPIA
	() ()	(r)	ල දී	(4) (A) (A) (A)	(<u>c</u>)	9)	E	· 8	6 U	(S)		(12)	(13) (Fg)	(14)	(1) (1)	(16)
Sharda Main Canal										Į						
at Head	1,612,633	387,032	301,365	4,395	0.76	0.85	0.73	0.47	2,066	650	1,927	100%	123,330	41%	424,695	110%
at Bifurcation	1,080,886	259,413	(187,591)	3,265	0.76	0.85	0.75	0.48	1,567	245	1.157	100%	106,199	57%	293,790	113%
Kheri Branch Canal	323,114	17.87	(60,383)	980	0.76	0.85	0.75	0.48	194	₹	403	100%	16,032	27%	76,415	%66
Hardoi Branch Canal													-		:	
at Head	757,772	166,917	127.208	2,305	0.76	0.85	0.75	0.48	1.106	136	75	100%	\$ 1, 5	73%	219,662	132%
at 23 miles	723,599	156,665	123,008	2,043	0.76	0.85	0.78	0.50	1,022	198	726	100%	83.717	68%	206,725	132%
at 53 miles	668,895	143,576	109,628	1,696	0.76	0.85	0.80	0.52	887	181	635	100%	25,923	67%	183,571	128%
Lucknow Branch Canal (55 miles)									٠	:						
at 99 miles	308,771	74,105	48,733	651	0.76	0.85	0.83	0, X	352	81	291	100%	23,814	49%	72,547	%86 %86
Asiwan Branch Canal						*										
atTail	152,379	36,551	25,669	265	0.76	0.85	0.85	0.55	146	36	137	100%	8,375	33%	¥ 49	93%
Purwa, Unnao Branch Canal																
T motor December 7																:
Lockiow Digital Callal	201	27 507	14044	Ę	72.0	900	0	ç	000	7.5	900	1000	30.07	9,00	95.036	137.61
at nead Sandila Branch Canal (50 miles)	CH. 107	Ĭ,	10K*	(c)	9	6.9	0	45.0	265	?	ş	8	3,7,7	Q-16	00%,00	02177
at 72 miles	97,570	23,418	17,237	256	0.76	0.85	0.85	0.55	141	22	16	100%	13,581	79%	30,818	132%
													•			.*
Sandila Branch Canal																
at Head	71,672	17,201	8,921	<u>3</u>	0.76	0.85	0.85	0.55	8	29	4	100%	11,066	124%	19,987	116%
Asiwan Branch Canal																
at Head	85,511	20,542	11,535	126	0.76	0.85	0.85	0.55	69	22	62	100%	5,470	47%	17,005	83%
					-			*								
Purwa Branch Canal	373 72	200	7,000	99	i c	900	0	ų V	3		6	900	7767	300	307.00	1160
at 30 miles	32,638	10,062	5,485	8 %	0.76	0.85	0.85	0.55	\$	7	8 8	10%	4918	8 8 8 8	10,403	103%
Torac Averal										٠						
at Head	77.814	18.657	10.747	8	0.76	0.85	0.85	0.55	83	11	51	100%	2,413	22%	13,160	71%
at 33 miles	31,465	11,124	3,327	17	0.76	0.85	0.85	0.55	6	7	18	%68	0	%0	3,327	30%
Remarks: (1) Culturable commanded area	ırea				(9) F	(9) Field supplied volume	ed volume									
(2) Proposed irrigated area (24% of CCA)	24% of CCA)	٠			01)	round wate	(10) Ground water development	ıent								
					(11) F	(11) Field water requirents	equirents									
					(12) II (53)	rigation su	(12) Irrigation sufficiency to field requirements	field requi	rements	***************************************						
(3) Application efficiency inclusive of conveyance loss of watercourse (6) Conveyance efficiency of Distributary/Minor	isive or conveyant Sistributary/Minor	SE IOSS OF WATER	School		T (51)	Sumated in	(13) Estimated increased impated area by improvement (14) Rate of increased impated area to actual impated area	galeu area ed area to a	oy milpios settral irri	enicii. vated area			:			
	/sin/Branch		*		4 (F.S.	ctimated to	(15) Hetimated total imposted area	area								
					(16) 7	ate of irrig	(16) Rate of irrigated area to PIA	PIA				٠				
			. !	;				i.								

Source:

- Rabi Water Distribution under Improved Condition and with Ground Water Development Rate of 35% (2/2) Table A.18

Substitution CLA Part March	ł																	
11 11 12 13 13 14 14 15 14 14 14 14 14		Canal System	ČČ	PIA	AIA	ASV	57 - 1989/9 FAP.E C	23	NO.	OVLE	PSV	QWV	표	SI		ZIA/AIA	ETIA	ETIA/PIA
1,61,026.3 1,62,126.3 1,6			€€	€ 6	€ €				6		· 6		3	(12)		(14)	(51)	(16)
1,616,653 4,613 1,624	lo	Sharda Main Canal	(112)	(Da)	(114)	(MCM)					(MCM)	ı	MCM)	(%)	(04)		(03)	
1,080,886 270,222 C35,446 1,906 C45 C48 C47 C47 C44 S48 C47 C47 C48 C48 C47 C48		at Head	1,612,633	403,158	329,422	2,982	0.67	0.87	0.73	0.43	1,282	28,1	1,415	100%	422,731	128%	752,153	187%
## 125.3114 Sign 179 (65004) Sig 10 of 10		at Bifurcation	1,080,886	270,222	(255,446)	1,906	0.67	0.87	0.77	0.45	888	736	911	100%	191,627	75%	447,073	165%
Part	j¥Ç ⊩	Cheri Branch Canal	323,114	80,779	(66,004)	. 561	0.67	0.87	0.77	0.45	252	<u>4</u>	257	%001	36,649	26%	102,654	127%
This commanded area	4				4	1	ļ		1	;	1		į	1		į		1
723.99 18,089 18,589 12,50 1067 1267		at Head	757,772	189,442	162,239	1,345	0.67	0.87	0.77	0.45 3.15	§ (8	%	100%	133,884	83%	296,123	156%
Care CSS miles 308,771 77,194 65,419 372 0.67 0.87 0.88 462 545 572 1.09% 110,744 76% 2.85,500 1.00m 2.85,500		at 23 miles	723,599	180,899	158.567	1,226	0.67	0.87	0.80	0.47	576	35	939	18%	133,386	2	291,952	161%
Action (350 miles) 308,771 77,194 65,419 372 6.67 0.87 0.85 0.50 186 244 254 100% 45,407 69% 110,826 110,826 Action (250 miles) h.Camal h.Camal 122,379 38,096 32,450 198 0.67 0.87 0.85 0.50 99 107 126 100% 20,756 64% 53,446 110,826 11		at 53 miles	668,895	167,224	145,756	362	0.67	0.87	0.82	0.48	462	\$45	272	100%	110,744	76%	256,500	153%
308.771 77.134 65.419 372 6.67 0.87 0.85 0.50 186 2.44 254 100% 45.407 69% 110,225 1 http://dx.mail.cs/mail.c		Lucknow Branch Canal (55 miles)																
h Carnel 281,445		at 99 miles As wen Benech Canal	308,771	47,194	65,419	372	0.67	0.87	0.85	0.50	88	244	2 <u>5</u> 2	100%	45,407	%69	110,826	144%
h Canal (50 miles) 281,443 70,360 (22,806 364 0.67 0.87 0.82 0.48 175 225 2.50 100% 37,608 60% 100,414 3 30,448 3 31,448 3 31,448 135 0.67 0.87 0.85 0.50 43 61 70 100% 8,541 48% 33,448 31,451 17,672 17,918 17,637 86 0.67 0.87 0.85 0.50 43 61 70 100% 8,541 48% 26,178 17,514 19,453 17,514 19,453 17,718 14,718 17 18,718		at Tail	150 370	38 795	32.650	5	0.67	280	285	9	8	107	126	100%	20.756	879	53 40K	140%
281,443 70,360 62,806 364 0.67 0.87 0.82 0.48 175 225 250 100% 37,608 60% 100,414 1 June 10,500 11,502 11,5		Purwa, Unnao Branch Canal				2	<u>;</u>		3		:		Ì	2		?		
281,443 70,360 62,806 364 0.67 0.87 0.82 0.48 175 225 25 0.00% 37,608 60% 100,414 1 1 1 1,672 13.29 18.749 135 0.67 0.87 0.85 0.50 68 66 75 100% 14,699 78% 33,448 1 1 1,672 17,918 17,672 17,918 17,672 18.42 0.87 0.87 0.87 0.85 0.50 46 170 0.00% 34,690 74	H	Jucknow Branch Canal																
did Branch Canal (50 miles) and Canal Canal (50 miles) by Acral Imgatod attea (17,507 of Maintabanch (16) Rate of imgatod area (18,500 of Maintabanch (18) Rate of imgatod area (19) Rate of imgatod area (19) Rate of imgatod area (19) Rate of imgatod area (18) Rate		at Head	281,443	70,360	62,806	364	0.67	0.87	0.82	0.48	175	225	250	100%	37,608	%09	100,414	143%
inites 97,570 24,392 18,749 135 0.67 0.87 0.85 0.50 68 66 75 100% 14,699 78% 33,448 1 A		Sandila Branch Canal (50 miles)																
ranch Canal d and Canal a		at 72 miles	97,570	24,392	18,749	135	0.67	0.87	0.85	0.50	8	8	75	100%	14,699	78%	33,448	137%
ranch Canal and Canal and Ss,511 21,378 16,423 68 0,67 0,87 0,85 0,50 34 67 63 100% 9,776 60% 26,199 1 and the dark Canal and Canal and Canal and Canal and Canal ingated area (25% of CA) 1,587 4,683 1,781 4, 781	Q)	Sandila Branch Canal at Head	71,672	17,918	17,637	%	0.67	0.87	0.85	0.50	4	61	8	100%	8 13,	% 81	26,178	146%
ranch Canal anch Canal 32,638 19,455 18,643 17,592 81 0.67 0.87 0.85 0.50 41 57 69 100% 7,459 42% 25391 1 anch Canal anch Canal 32,638 19,482 7,677 72 0.67 0.87 0.85 0.50 37 100% 7,849 53% 22,567 1 (1) Culturable commanded area (2) Proposed irrigated area (25% of CCA) (3) Actual ingated area (3) Actual ingated area (30 Conveyance efficiency of Distributary/Minor (3) Conveyance efficiency of Main/Branch (4) Conveyance efficiency of Main/Branch (5) Overall irrigated area (3) Overall irrigated area (4) Actual irrigated area (5) Overall irrigated area (6) Conveyance efficiency of Main/Branch (6) Conveyance efficiency of Main/Branch (16) Rate of irrigated area to actual irrigated area to actual irrigated area (16) Rate of irrigated area to PIAA (16) Rate of irrigated area to PIAA (17) Conveyance efficiency of Main/Branch (18) Rate of irrigated area to PIAA (19) Conveyance efficiency of Main/Branch (10) Rate of irrigated area to PIAA (10) Conveyance efficiency of Main/Branch (10) Rate of irrigated area to actual irrigated area to actual irrigated area to PIAA (18) Conveyance efficiency of Main/Branch (19) Rate of irrigated area to actual irrigated area to PIAA (10) Conveyance efficiency of Main/Branch (11) Field water required area to PIAA (12) Conveyance efficiency of Main/Branch (13) Conveyance efficiency of Main/Branch (14) Conveyance efficiency of Main/Branch (15) Conveyance efficiency of Main/Branch (16) Rate of irrigated area to actual irrigated area to PIAA (17) Conveyance efficiency of Main/Branch (18) Conveyance efficiency of Main/Branch (19) Rate of irrigated area to actual i																		
anch Canal biles 32,638 10,482 7,677 72 0,67 0,87 0,87 0,87 0,87 0,87 0,87 0,87 0,8	•	Asiwan Branch Canal at Head	85,511	21,378	16,423	88	0.67	0.87	0.85	0.50	8	67	63	100%	9,776	%09	26,199	123%
d	14	Purwa Branch Canal																
arch Canal and Canal		at Head	74,565	18,643	17,932	87	0.67	0.87	0.85	0.50	4	21	8	100%	7,459	42%	25,391	136%
anch Canal d 77,814 19,453 14,718 73 0.67 0.87 0.85 0.50 37 50 57 100% 7,849 53% 22,567 1 (1) Culturable commanded area (2) Proposed irrigated area (25% of CCA) (3) Actual irrigated area (25% of CCA) (4) Actual supplied volume (5) Application efficiency of Distributary/Minor (6) Conveyance efficiency of Main/Branch (7) Conveyance efficiency (8) Overall irrigation efficiency (9) Figure area (25% of CCA) (10) Ground water development (11) Field water requirents (12) Irrigation sufficiency to field requirements (13) Estimated irrigated area by improvement (14) Rate of increased irrigated area to actual irrigated area (15) Estimated total irrigated area (16) Estimated total irrigated area (17) Conveyance efficiency (18) Estimated total irrigated area (19) Figurated of irrigated area (19) Figurated area by improvement (10) Ground water requirents (11) Figurated irrigated area to actual irrigated area (12) Estimated total irrigated area (13) Estimated total irrigated area (14) Rate of irrigated area (15) Estimated total irrigated area (16) Rate of irrigated area (17) Conveyance efficiency (18) Estimated total irrigated area (19) Figurated area (19) Figurated irrigated area (19) Figurated are		at 30 miles	32,638	10,482	7.677	77	0.67	0.87	0.85	0.50	36	23	30	100%	7,088	%75	14,765	141%
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	ب	Unnao Branch Canal												٠				
(1) Culturable commanded area (2) Proposed irrigated area (25% of CCA) (3) Actual irrigated area (25% of CCA) (4) Actual supplied volume (5) Application efficiency of Distributary/Minor (6) Conveyance efficiency of Main/Branch (7) Conveyance efficiency (8) Overall irrigation efficiency (9) Field supplied volume (10) Ground water development (11) Field water requirents (12) Irrigation sufficiency to field requirements (13) Estimated increased irrigated area by improvement (14) Rate of increased irrigated area (15) Estimated total irrigated area (15) Estimated total irrigated area (16) Estimated total irrigated area (17) Conveyance efficiency (18) Estimated total irrigated area (19) Field supplied volume (19) Field supplied volume (10) Ground water development (11) Field water requirents (12) Irrigation sufficiency to field requirements (13) Estimated irrigated area to actual irrigated area (14) Rate of increased irrigated area (15) Estimated total irrigated area (16) Rate of irrigated area (17) Conveyance efficiency (18) Estimated total irrigated area (19) Field supplied volume (19) Field volume (19) Field supplied volume (19) Field water requirents (19) Field supplied volume (19) Field supp		at Head	77,814	19,453	14,718	to	0.67	0.87	0.85	0.50	37	જ	2	100%	7,845	23%	22,567	116%
 Culturable commanded area Proposed irrigated area (25% of CCA) Actual irrigated area Actual irrigated area Application efficiency inclusive of conveyance loss of watercourse Conveyance efficiency of Distributary/Minor Conveyance efficiency of Main/Branch Overall irrigation efficiency 		at 33 miles	31,465	11,587	4,683	17	0.67	0.87	0.85	0.50	80	22	18	100%	3.04	65%	TZT.T	67%
	H4	<u>∃</u> 89€89€8	of CCA) of conveyance outary/Minor Stranch	loss of waterco	urse		(9) F (10) G (11) F (12) Ir (13) E (14) R (15) R (15) R	ield suppli fround wat ield water rigation su stimated ii ate of incr stimated to	ted volume ter develop requirents afficiency ncreased in reased imigat otal imigat	e oment to field requ mgated area gated area to ed area to PIA	uirements a by improi o actual irri	rement gated area						

Source: Data were collected from Irrigation Department, Ground Water Department of UP

- Kharif Water Distribution under Improved Condition and with Ground Water Development Rate of 50% (1/2) Table A.19

Canal System CCA P1A A1A ASV FAPIN nel (1) (2) (3) (4) (5) (4) (5) (4) (5) (4) (5) (4) (5) (4) (5) (4) (5) (4) (5) (4) (5) (4) (5) (5) (4) (5) (5) (5) (5) (5) (5) (5) (5) (5) (5	Substitution	1					Kharif(1986 - 1990)	(066)											- 1
1,	(i) (ii) (iii) (ii		Canal System	CCA	PIA	AIA	ASV	FAP.E	COV.E2	CON.EI	OVI.E	FSV	QWV	FIR	IS		HAIAIA	ETIA	
Stander Main Carrel at Head at Elevander	Stander Main Cornel at Rhead at Stander Cornel at Stander at Stander Cornel at Stand			(3)	(2)	<u>@</u>	(4)	(S)	(9)	3		6		(11)	(12)		(14)	(15)	
Standard Advisor(Carallet) 1612.633 S87.1022 S91.965 4.395 O.76 O.85 O.77 O.47 O.66 S98 1.977 100% 1.574 O.67 O.85 O.75 O.48 4.57 O.47 O.66 S. S. S. A	Standard Consult 1612.653 587.322 301.565 4.395 0.76 0.655 0.77 0.47 2.066 928 1.977 10.06 1.61.253 0.65 1.977 0.47 2.066 0.75 0.48 1.57 10.06 1.57 10.06 1.57 10.06 1.57 10.06 1.57 10.06 1.57 10.06 1.57 10.06 1.57 10.06 1.57 10.06 1.57 10.06 10.06 1.57 10.06 1.57 10.06 10.06 1.57 10.06 1.57 10.06 10.06 1.57 10.06 10.06 1.57 10.06	'		(ha)	(ha)	(fra)	(MCM)			***************************************		(MCM)	1	MCM	(%)	(ha)		(ha)	i
a title fluctuation (1.00126.55) 10.000 (1.0012.55)	March Branch Canal 150,2500 20,547 20,54		Sharda Main Canal	•					.							- 1			
Registration 150,000 25,	National Branch Canal Statistics 175,777 166,977 177,788 950 0.75 0.85 0.75 0.85 1.35 0.95 0.75 0.85 0.75		at Head	1,612,633	387,032	301,365	4,395 5,00 1,00 1,00 1,00 1,00 1,00 1,00 1,0	0.76	0.85	0.75 57.0	0.47	2,066	875	726	1	166,869	55%	468,234	
Percent State Charles 251,147 17,275 10,045 17,278 17,	Authority Branch Caral 7.277 1.00, 20.57 7.00 0.05 0.	•	at bilurcation	1,000,830	514,452	(160,01)	5,400	9 0	200	0 10	9 0	8.5	ရှိ ရ	/51.1		577,571	8 6 8 6	20,014	
at Sheet, and a case of states 1757777 1865917 17208 2305 0.75 0.85 1.105 230 754 1005 0.84 1.105 230 754 1005 0.84 1.105 230 754 1005 0.84 1.105 230 754 1005 0.85 0.75 0.85 0.75 0.85 0.75 0.85 0.75 0.85 0.75 0.85 0.75 0.85 0.75 0.85 0.75 0.85 0.75 0.85 0.75 0.85 0.75 0.85 0.75 0.85 0.75 0.85 0.75 0.85 0.75 0.85 0.75 0.85 0.75 0.85 0.75	## Hand ## 155 miles		Nett Branch Canal Harder Branch Canal	523,114	À.	(coc*00)	200	0 0	C8.0	0.0	ę S	Ş	2	€ €	100%	19,11/9	37.50	100.6/	
at 25 miles at 30	12 miles 12 miles 123 miles 156 663 123 008 126 668 120 008 120 miles 12		at Head	757.772	166.917	127,208	2.305	0.76	0.85	0.75	87	1.106	280	4	100%	106.625	843	233,833	
at Smittes Lucktown Branch Caral (SS miles) Lucktown Branch Caral Aswaran Branch Caral Sandlish Branch Caral Sandlish Branch Caral Aswar Bra	Asian Branch Canal (SF miles)		at 23 miles	723.599	156.665	123.008	2043	0.76	0.85	27.0	0.50	1.022	283	726	100%	98.101	; % ; %	221 109	
Lucknoow Branch Chanal (55 miles) Asyman Branch Chanal Asyman Br	Luckroof Branch Canal (SS miles) 4 Short Branch Canal (SS miles) 4 Short Branch Canal (SS miles) 5 308,771		at 33 miles	668.895	143.576	109.628	- 1 2 3 3 4	2.0	28.0	28.0	0.52	28	259	63.5	100%	87.357	808	196.985	
a type miles Asive Enactic Canal Asive Enacti	at 59 miles Asymmetric Charal		Lucknow Branch Canal (55 miles)				2 2 2	<u>}</u>	3	3		}	ì	}			}		
Asiwan Branch Canal at Tail Luochcow Branch Canal at Head at Head Sandia Branch Canal at Head at Head at Head Asiwan Branch Canal at Head at Head at Head Asiwan Branch Canal at Head at Head at Head Asiwan Branch Canal at Head Asiwan Branch Canal at Head at Head Asiwan Branch Canal Asiwan Branch Canal at Head Asiwan Branch Canal Asiwan Branch Canal at Head Asiwan Branch Canal Asiwan Asiwan Branch Canal Asiwan Branch Canal Asiwan Asiwan Branch Canal Asiwan Branch Canal Asiwan Branch Canal Asiwan	Asiwan Branch Canal Lucktown Branch Canal at Head Sandia Branch Canal at Head Asiwan Branch		at 99 miles	308.771	74.105	48,733	651	0.76	0.85	0.83	35.0	352	116	291	100%	29.642	618	78.375	
150,2379 36,551 25,669 265 0.76 0.85 0.85 146 51 137 100% 11,242 44% Luckrow Branch Canal at Head 281,443 07,547 44,961 731 0.76 0.85 0.85 0.85 146 51 137 100% 11,242 44% Sandila Branch Canal (50 miles) 97,570 23,418 17,257 256 0.76 0.85 0.85 0.55 141 31 91 100% 15,349 89% Sandila Branch Canal (50 miles) 97,570 23,418 17,257 256 0.76 0.85 0.85 0.55 141 31 91 100% 15,349 89% Sandila Branch Canal (50 miles) 97,570 23,418 17,251 256 0.76 0.85 0.85 0.55 85 29 47 100% 15,349 89% Sandila Branch Canal (50 miles) 97,570 17,201 8,921 154 0.76 0.85 0.85 0.85 0.55 87 100% 12,349 89% Sandila Branch Canal (50 miles) 97,570 17,201 8,921 154 0.76 0.85 0.85 0.85 0.55 87 100% 12,349 89% Sandila Branch Canal (50 miles) 97,570 17,201 8,921 154 0.76 0.85	152,379 36,551 25,669 266 0.76 0.85 0.85 1.46 51 137 100% 11,242 44% Luckrow Banch Canal at Head Sandila Branch Canal at Head 28,511 20,542 11,237 2.56 0.76 0.85 0.85 0.85 0.55 141 31 91 100% 12,376 139% Asiwa Banch Canal at Head 31,465 11,244 33,271 34,57 10,747 34,58 10,747 34,58 10,747 34,58 11,124 33,271 34,58 34,518 34,518 34,521 34,521 34,58 34,518 3		Asiwan Branch Canal					:			!	} 							
Purva, Unaso Branch Canal at Head Sandila Branch Canal at Head Asiven Branch Canal at Head Asive Branch Canal As	Purva, Unioo Branch Canal at Head 281,443 67,547 44,961 731 0.76 0.85 0.80 0.52 380 107 238 100% 47,039 105% 380 107 238 100% 47,039 105% 380 107 238 100% 47,039 105% 380 107 238 100% 47,039 105% 380 107 238 100% 47,039 105% 380 107 238 100% 47,039 105% 380 107 238 100% 47,039 105% 47,039 47,039 47,039		at Tail	152,379	36,551	25,669	265	0.76	0.85	0.85	0.55	54.	51	137	100%	11,242	44%	36,911	
Luckrown Branch Canal at Head 281,443 67,547 44,961 731 0.76 0.85 0.80 0.52 380 107 238 100% 47,039 105% 380 341 342 3	Lucktoow Branch Canal at Head 281,443 67,547 44,961 731 0.76 0.85 0.80 0.52 380 107 238 100% 47,039 105% 380 3		Purwa, Unnao Branch Canal				٠	÷										-	
Asivan Banch Canal So miles) Sandia Branch Canal So miles Sandia Branch Canal So miles Sandia Branch Canal So miles Sandia Branch Canal Asivan Branch Canal T1,672 T1,673 T1,674 T1,674 T1,675 T1,674 T1,675 T1,6	Sandia Branch Canal S81443 67,547 44,961 731 0.76 0.85 0.86 0.52 380 107 238 100% 47,039 105% 387	ĺ	Town Control of the second second																
Sandila Branch Canal (50 miles) Sandila Branch Canal at Head Asiwan Branch Canal at Head Asimal at Head Asim	Sandlia Branch Caral (50 miles) Sandlia Branch Caral (50 miles) 97,570 23,418 17,237 256 0,76 0,85 0,85 0,85 1,139 88,511 20,542 11,237 256 0,76 0,85 0	•	Lichnow Dialica Causa	281 443	147	44.95	ţ	A7. 0	0.85	080	0.50	380	107	238	100%	47.039	105%	92.000	
Sandila Branch Canal at Head Asiwan Branch Canal at Head Asiwan Branch Canal at Head Asiwan Branch Canal at Head Tri Sri 17201 8,921 154 0.76 0.85 0.85 0.85 0.85 141 31 91 100% 12,717 143% Purva Branch Canal at Head Asiwan Branch Canal at Head Tri Sri 1201 8,921 11,535 126 0.76 0.85 0.85 0.85 0.85 0.85 0.85 0.85 0.85	Sardita Branch Chall at Head Asiwan Branch Chall at Head at 30 miles 17.672 17.672 17.672 17.672 17.672 17.672 17.672 17.672 17.672 17.672 17.672 17.672 17.672 17.672 17.672 17.672 17.672 17.673 17.672 17.672 17.672 17.672 17.673 17.672 17.672 17.672 17.673 17.672 17.673 17.673 17.673 17.674 14.572 17.674 14.572 17.674 17.675 17.674 17.675 17.674 17.675 17.674 17.675 17.674 17.675 17.674 17.675 17.674 17.675 17.674 17.675 17.674 17.675 17		Sandila Branch Canal (50 miles)	7	1	1001		3	3	3	1	}	2	}		200	2		
Sandila Branch Canal at Head Asiwan Branch Canal at Head Purva Branch Canal at Head T4.565 17.894 14.922 11.535 126 0.76 0.85 0.85 0.85 0.55 92 27 90 100 7,256 63% 100 7,256 63% 100 7,256 63% 100 7,256 63% 100 7,256 63% 100 7,256 63% 100 7,256 11.355 11.24 14,922 11.355 126 0.76 0.85 0.85 0.85 0.85 0.85 0.85 0.85 0.85	Sandila Branch Canal at Head Asiwan Branch Canal at Head Asiwan Branch Canal at Head Asiwan Branch Canal at Head at Actual supplied volume (3) Actual supplied volume (3) Actual supplied volume (4) Actual supplied volume (5) Conveyance of Richency of Main Branch (10) Grown of Sanch Charal (10) Branch Counting are at 30 miles (11) Fleid water requirements (12) Conveyance of Richency of Main Branch (13) Conveyance of Richency of Main Branch (14) Rade of increased irrigated area (15) Conveyance of Richency of Main Branch (16) Conveyance of Richency of Main Branch (17) Conveyance of Richency of Main Branch (18) Conveyance of Richency of Main Branch (19) Conveyance of Richency of Main Branch (10) Conveyance of Richency of Main Branch (14) Rade of increased irrigated area (15) Conveyance of Richency of Main Branch (16) Conveyance of Richency of Main Branch (17) Conveyance of Richency of Main Branch (18) Conveyance of Richency of Main Branch (19) Conveyance of Richency of Main Branch (10) Conveyance of Richency of Main Branch (11) Richency of Main Branch (12) Conveyance of Richency of Main Branch (13) Conveyance of Richency of Main Branch (14) Rade of increased irrigated area to actual irrigated area (15) Conveyance of Richency of Main Branch (16) Conveyance of Richency of Main Branch (17) Conveyance of Richency of Main Branch (18) Conveyance of Richency of Main Branch (19) Conveyance of Richency of Main Branch (19) Conveyance of Richency of Main	Δ	at 72 miles	97,570	23,418	17,237	256	0.76	0.85	0.85	0.55	141	31	፳	100%	15,343	86%	32,580	
Asiwan Branch Canal at Head Asiwan Branch Canal at Head Asiwan Branch Canal at Head Branch Canal at Head Asiwan Branch Canal at Head at Head Branch Canal at Head at H	Asiwan Branch Canal at Head Asiwan Branch Canal at Head Asiwan Branch Canal at Head T.4.565 17.894 14.922 168 0.76 0.85 0.85 0.55 92 27 80 100% 7.274 49% at 30 miles Branch Canal at Head T.7.814 18.657 10.747 96 0.76 0.85 0.85 0.55 92 0.7 80 100% 7.274 49% 1.0 max Branch Canal at Head Asiwan Branch	. 6																	
85,511 20,542 11,535 126 0.76 0.85 0.85 0.55 69 32 62 100% 7,274 49% 7,456 11,124 14,922 168 0.76 0.85 0.85 0.55 92 27 80 100% 7,274 49% 10,062 3,485 87 0.76 0.85 0.85 0.55 99 100% 5,485 100% 7,274 49% 11,124 18,657 10,747 96 0.76 0.85 0.85 0.55 99 10 18 100% 3,771 35% 10 11,124 3,327 17 0.76 0.85 0.85 0.55 99 10 18 100% 3,771 35% 10 18 100% 11,124 3,327 17 0.76 0.85 0.85 0.55 99 10 18 100% 3,771 35% 10 18 10 1	## 85,511 20,542 11,255 126 0.76 0.85 0.85 0.55 92 27 80 100% 7,274 49% 14,922 168 0.76 0.85 0.85 0.55 92 27 80 100% 7,274 49% 14,922 168 0.76 0.85 0.85 0.55 92 27 80 100% 7,274 49% 14,922 168 0.76 0.85 0.85 0.55 92 10 29 100% 7,274 49% 14,922 100% 11,124 3,327 17 0.76 0.85 0.85 0.55 9 10 18 100% 1,185 6% 11,124 3,327 17 0,76 0.85 0.85 0.85 0.85 0.85 0.85 0.85 0.85		Sandija Branch Canal	71 673	17.204	9	2	6	0	0	v C	ò	0,	ť	100%	12717	1720	21 638	
85,511 20,542 11,535 126 0.76 0.85 0.85 0.55 69 32 62 100% 7,256 63% 74,565 17,894 14,922 168 0.76 0.85 0.85 0.55 92 27 80 100% 7,274 49% 32,638 10,062 5,485 87 0.76 0.85 0.85 0.55 92 10 29 100% 7,274 49% 1 77,814 18,657 10,747 96 0.76 0.85 0.85 0.55 99 10 18 100% 3,771 35% turable commanded area posed irrigated area 10 Ground water development 11 124 3,327 17 0,76 0.85 0.85 0.55 99 10 18 100% 3,771 35% 11 124 3,327 17 0,76 0.85 0.85 0.55 99 10 18 100% 185 6% 11 124 3,327 17 0,76 0.85 0.85 0.85 0.55 99 10 18 100% 185 6% 11 124 3,327 17 0,76 0.85 0.85 0.85 0.55 99 10 18 100% 185 6% 11 154 3,327 17 0,76 0.85 0.85 0.85 0.55 99 10 18 100% 185 6% 12 11 1124 3,327 17 0,76 0.85 0.85 0.85 0.85 0.85 0.85 0.85 0.85	S5,511 20,542 11,535 126 0.76 0.85 0.85 0.85 6.95 59 32 62 100% 7,256 63% 17,894 14,922 168 0.76 0.85 0.85 0.85 0.55 48 10 29 100% 7,274 49% 10,062 5,485 87 0.76 0.85 0.85 0.85 0.55 59 10 18 100% 7,274 49% 10,062 5,485 10,747 96 0.76 0.85		מרוזקמת	7/0,1/	102,1	0,741	<u> </u>	2	000	6.0		3 :	7	ì	200	17:17	2	2017	
85,511 20,542 11,535 126 0.76 0.85 0.85 0.55 69 32 62 100% 7,256 63% 23,511 20,542 11,535 126 0.76 0.85 0.85 0.55 92 27 80 100% 7,274 49% 23,638 10,062 5,485 87 0.76 0.85 0.85 0.55 92 27 80 100% 7,274 49% 10,062 5,485 10,747 96 0.76 0.85 0.85 0.55 99 10 18 100% 3,471 35% 100% 11,124 3,327 17 0,76 0.85 0.85 0.55 99 10 18 100% 3,771 35% 100% 10,010	85,511 20,542 11,535 126 0.76 0.85 0.85 6.9 32 62 100% 7,256 63% 17,894 14,922 168 0.76 0.85 0.85 0.85 92 27 80 100% 7,274 49% 10,062 5,485 10,076 0.85 0.85 0.85 0.85 92 27 80 100% 7,274 49% 10,062 5,485 10,074 96 0.76 0.85 0.85 0.85 0.85 92 10 10,074 11,124 3,327 17 0.76 0.85 0.85 0.85 0.85 0.85 0.85 0.85 0.85		Asiwan Branch Canal														,		
14,565 17,894 14,922 168 0.76 0.85 0.85 0.55 92 27 80 100% 7.274 49% 100% 32,638 10,062 5,485 87 0.76 0.85 0.85 0.55 48 10 29 100% 5,485 100% 11,124 3,327 17 0.76 0.85 0.85 0.55 99 10 18 100% 5,485 100% 11,124 3,327 17 0.76 0.85 0.85 0.55 99 10 18 100% 3,771 35% 100% 11,124 3,327 17 0.76 0.85 0.85 0.85 0.85 9 10 18 100% 3,771 35% 100% 11,124 3,327 17 0.76 0.85 0.85 0.85 0.85 9 10 18 100% 1,85 6% 1,1124 3,327 17 0.76 0.85 0.85 0.85 0.85 9 10 18 100% 1,85 6% 1,85 0.85 0.85 0.85 0.85 0.85 0.85 0.85 0.	74,565 17,894 14,922 168 0.76 0.85 0.85 0.55 92 27 80 100% 7,274 49% 32,638 10,062 5,485 87 0.76 0.85 0.85 0.85 0.55 92 27 80 100% 7,274 49% 14,922 168 0.76 0.85 0.85 0.85 0.85 0.85 0.85 0.85 0.85		at Head	85,511	20,542	11,535	126	0.76	0.85	0.85	0.55	69	32	62	100%	7,256	63%	18,791	
74,565 17,894 14,922 168 0.76 0.85 0.85 0.55 92 27 80 100% 7.274 49% 10.062 5,485 87 0.76 0.85 0.85 0.85 92 27 80 100% 5,485 100% 10.062 10.062 5,485 87 0.76 0.85 0.85 0.85 92 27 80 100% 5,485 100% 10.062	74,565 17,894 14,922 168 0.76 0.85 0.85 0.55 92 27 80 100% 7,274 49% 1,224 1,006 2,5485 87 0.76 0.85 0.85 0.55 48 10 29 100% 5,485 100% 1,006 2,124 1,006 2,124 1,006 2,124 1,006 2,124 1,006 2,124 1,006 2,124 1,006 2,124 1,		Denote Denote Down		ć										•				
77,814 18,657 10,747 96 0,76 0,85 0,85 0,55 48 10 29 100% 5,485 100% 20,100% 3,771 35% 21,465 11,124 3,327 17 0,76 0,85 0,85 0,55 9 10 18 100% 1,85 6% 20,85 of CCA) turable commanded area (24% of CCA) all inigated area (24% of CCA) all inigated area (10) Ground water development inigated area (10) Ground water requirements (11) Field water requirements (12) Imaginon sufficiency to field requirements (13) Estimated increased imagated area by improvement (14) Rate of increased imagated area (15) Estimated of increased imagated area (15) Estimated total imagated area (15) Estimated Estimat	32,638 10,062 5,485 87 0.76 0.85 0.85 0.55 48 10 29 100% 5,485 100% 100% 10,062 10,062 5,485 87 0.76 0.85 0.85 0.55 9 10 18 100% 1,485 11,124		r ui wa Diancii Cana at Head	74 565	17 894	14 922	168	0.76	0.85	0.85	0.55	8	27	8	100%	7.274	499	22.196	
T7,814 18,657 10,747 96 0.76 0.85 0.85 0.55 53 24 57 100% 3,771 35% 20.85 0.15 53 24 57 100% 3,771 35% 20.85 0.15 59 10 18 100% 1.85 6% 20.85 0.15 24 57 100% 3,771 35% 20.85 0.15 24 57 100% 1.85 6% 20.85 0.15 24% 0.15 2	T7,814 18,657 10,747 96 0.76 0.85 0.85 6.35 53 24 57 100% 3,771 35% 50.85 51,124 3,327 17 0.76 0.85 0.85 0.55 9 10 18 100% 185 6% 50.85 51,124 3,327 17 0.76 0.85 0.85 0.55 9 10 18 100% 185 6% 50.85 0.85 0.55 9 10 18 100% 185 6% 50.85 0.85 0.85 0.85 0.85 0.85 0.85 0.8		at 30 miles	32,638	10,062	5,485	8	0.76	0.85	0.85	0.55	. &	i ^으	52	100%	5,485	100%	10,970	
T7,814 18,657 10,747 96 0.76 0.85 0.85 9.24 57 100% 3,771 35% turable commanded area associating ated area (24% of CCA) Solution of incidency inclusive of conveyance loss of watercourse (10) Estimated increased irrigated area to actual irrigated area (14) Rate of increased irrigated area to actual irrigated area (15) Estimated total irrigated area to actual irrigated area (15) Estimated total irrigated area (15) Estimated area (15) Estimated total irrigated area (15) Estimated total irrigated area (15) Estimated (15) Estimated area (15) Estimated (15) Estimated (15) Estimated (15) Estimated (15) Estimated (15) Estimated (15) Estimate	T77,814 18,657 10,747 96 0.76 0.85 0.85 0.55 53 24 57 100% 3,771 35% turable commanded area 21,465 11,124 3,327 17 0.76 0.85 0.85 0.55 9 10 18 100% 185 6% 1000% 1000% 185 6% 1000%	•	1			2.*													
10, 10, 10, 10, 10, 10, 10, 10, 10, 10,	10,747 10,747 10,747 10,76 10,85 10,95 10,75 1		Unnao Branch Canal	į	1970	1	č	ì	400	0	7	8		7	2000	,	250	11 610	
(1) Culturable commanded area (24% of CCA) (2) Field supplied volume (2) Froposed irrigated area (24% of CCA) (3) Actual irrigated area (24% of CCA) (1) Field water requirements (4) Actual supplied volume (5) Application efficiency of Distributary/Minor (6) Conveyance efficiency of Main/Branch (15) Estimated total irrigated area (16) Estimated total irrigated area (17) Conveyance efficiency of Main/Branch (18) Estimated total irrigated area (18) Estimated Estima	(1) Culturable commanded area (24% of CCA) (10) Ground water development (10) Ground water development (11) Ground water requirements (12) Actual impated area (24% of CCA) (11) Field water requirements (12) Impation sufficiency of Distributary/Minor (13) Estimated increased irrigated area to actual irrigated area (14) Conveyance efficiency of Main/Branch (15) Estimated total irrigated area (15) Estimated Estima		at riead	410,7	18,02/	10,747	ዩ፻	0.70	0.00	0.00	מיים כ	n c	† 5	ÿ	0001	10,0	8,00 8,00 8,00	010,4	
 (1) Culturable commanded area (2) Proposed irrigated area (24% of CCA) (3) Actual irrigated area (4) Actual supplied volume (5) Application efficiency inclusive of conveyance loss of watercourse (6) Conveyance efficiency of Distributary/Minor (7) Conveyance efficiency of Main/Branch 	(1) Culturable commanded area (2) Proposed irrigated area (24% of CCA) (3) Actual irrigated area (4) Actual supplied volume (5) Application efficiency inclusive of conveyance loss of watercourse (6) Conveyance efficiency of Distributary/Minor (7) Conveyance efficiency of Main/Branch (8) Conveyance efficiency of Main/Branch		See	1	11.124	1755			C97	Ceio	0.33	١	2	0	100%	<u> </u>	0,0	2777	
Proposed irrigated area (24% of CCA) Actual irrigated area Actual irrigated area Actual supplied volume Application efficiency inclusive of conveyance loss of watercourse Conveyance efficiency of Distributary/Minor Conveyance efficiency of Main/Branch	Proposed irrigated area (24% of CCA) Actual irrigated area Actual supplied volume Application efficiency inclusive of conveyance loss of watercourse Conveyance efficiency of Distributary/Minor Conveyance efficiency of Main/Branch		3	rea		•		(6)	ield suppli	ed volume									
Actual irrigated area Actual supplied volume Application efficiency inclusive of conveyance loss of watercourse Conveyance efficiency of Distributary/Minor Conveyance efficiency of Main/Branch	Actual irrigated area Actual supplied volume Application efficiency inclusive of conveyance loss of watercourse Conveyance efficiency of Distributary/Minor Conveyance efficiency of Main/Branch		 Proposed imigated area (2) 	24% of CCA)				000	Fround wat	er developr	nent								
clusive of conveyance loss of watercourse f Distributary/Minor f Main/Branch	Actual supplied volume Application efficiency inclusive of conveyance loss of watercourse Conveyance efficiency of Distributary/Minor Conveyance efficiency of Main/Branch		(3) Actual irrigated area					(11)	ield water	requiremen	វរ្ព	-							
Application efficiency inclusive of conveyance loss of watercourse Conveyance efficiency of Distributary/Minor Conveyance efficiency of Main/Branch	Application efficiency inclusive of conveyance loss of watercourse Conveyance efficiency of Distributary/Minor Conveyance efficiency of Main/Branch		(4) Actual supplied volume	:				(12)	rngation su	ifficiency to	o field regu	rements							
Conveyance efficiency of Distributary/Minor Conveyance efficiency of Main/Branch	Conveyance efficiency of Distributary/Minor Conveyance efficiency of Main/Branch			sive of conveyant	e loss of waten	contre		(13) 1	Stimated n	ncreased in	igated area	by impro	vement					į.	
Conveyance efficiency of Main/Branch	Conveyance efficiency of Main/Branch			hstributary/Minor				(14)	Rate of incr	eased imga	ted area to	actual irri	gated area						
	Outside 18 State of State of			fain/Branch				(15)	3stimated to	otal irrigate.	d area					-			

Data were collected from Imgation Department, Ground Water Department of UP

Source:

- Rabi Water Distribution under Improved Condition and with Ground Water Development Rate of 50% (2/2) Table A.19

				1300175450	0.4571006707 10007001	6										
Canal System	V	PIA	AIA	ASV	FAPE C	, E2	CONE	OVIE	YS:	GWV	FIR	SI	EII'A	EIIA/AIA	ETIA	ETIA/PIA
Transfer more	E {	8	6 3	_					(e)	(01)	(E)	(12)		(14)	(15)	(16)
Sharda Main Canal	(mg)	(108)	(lid)	(INICINI)					(MCM)	(MCM)	(MIC/MI)	(%)	(E)		(III)	
at Head	1,612,633	403.158	329,422	2.982	0.67	0.87	0.73	0.43	1.282	2.784	1.415	100%	617.172	187%	946.594	235%
at Bifurcation	1,080,886	270,222	(255,446)	1,906	0.67	0.87	0.77	0.45	858	1,052	911	100%	280.122	110%	535,568	198%
Kheri Branch Canal	323,114	80,779	(66,004)	561	0.67	0.87	0.77	0.45	252	211	257	100%	52,906	80%	118,911	147%
Hardoi Branch Canal													-			
at Head	757,772	189,442	162,239	1,345	0.67	0.87	0.77	0.45	605	<u>%</u>	45	100%	196,473	121%	358,712	189%
at 23 miles	723,599	180,899	158,567	1,226	0.67	0.87	0.80	0.47	576	850	989	100%	196,962	124%	355,529	197%
at 53 miles	668,895	167,224	145,756	362	0.67	0.87	0.82	0.48	462	778	572	0001	170,219	1177%	315,975	189%
Lucknow Branch Canal (55 miles)												:				
at 99 miles	308,771	7,19	65,419	372	0.67	0.87	0.85	0.50	18%	349	52	100%	72,373	111%	137,791	179%
Asiwan Branch Canal	;				!	1		,	:	1						
at Lau Purwa Unnao Branch Canal	152,379	38,036	32,650	<u>8</u>	/90	/s C	0.85	9	3 ?	5	126	100%	32,650	%001 001	65,300	1/1%
														,		
Lucknow Branch Canal	281 443	0.2E 0.F	3000	26.0	0.67	0.00	3	87.0	361	300	Ş	1000	10013	000	124 607	191
Sandita Branch Canal (50 miles)	£ 107	300	0,700	5	ò	ò	70.0	Ŷ)	440	3	3	100,10	0 0	(S)*t77	
at 72 miles	97,570	24,392	18,749	135	0.67	0.87	0.85	0.50	88	46	75	100%	21,749	116%	40,498	166%
Sandila Branch Canal	573 17	91021	17 637	æ	190		88.0	ç		87	F	,00g	15117		37 754	1839
, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	2	0474	326.4	3	Š	}	}	}	≱	ŝ	2	2	1111	}	1	}
Asiwan Branch Canal at Head	85,511	21,378	16,423	88	0.67	0.87	0.85	0.50	*	95	63	100%	17,205	105%	33,628	157%
Purwa Branch Canal	. 1	!	į		!		!	;	:	•		1	-		- ;	į
at Head	32,638	18,643	17,932	ર્કે ફ્ર	0.67	0.87	0.85	S S	4 %	7 7	3 5	100%	13,774	1229	31,706	1,6%
at Commen			j.	1	5	}	3	}	3	;	₹	3		}	:	2
Unnao Branch Canal	4101	\$ C	,	ŧ	7	9	ù 0 0	ç	ţ	Ç	3	800	100	0167	55.00	17507
at Fread at 33 miles	31,465	11,587	4,40 589,4	ς <u>τ</u>	0.67	0.87	0.85	0.50	ò 00	31.	γ 8	100%	5,463	117%	10,146	88%
Remarks: (1) Culturable commanded area (2) Proposed irrigated area (25% of CCA) (3) Actual irrigated area (4) Actual supplied volume (5) Application Efficiency inclusive of conveyance loss of watercourse (6) Conveyance efficiency of Distributary/Minor (7) Conveyance efficiency of Main/Branch (8) Overall irrigation efficiency	6 of CCA) e of conveyance ibutary/Minor	loss of waterco	urse		(1) (1) (1) (1) (13) (14) (14) (15) (15) (16) (16)	eld supplii round wat round water eld water igation su stimated in ate of incr stimated to	(9) Field supplied volume (10) Ground water development (11) Field water requirements (12) Irrigation sufficiency to field (13) Estimated increased irrigated (14) Rate of increased irrigated ar (15) Estimated total irrigated area (16) Rate of irrigated area (16) Rate of irrigated area	(9) Field supplied volume (10) Ground water development (11) Field water requirements (12) Irrigation sufficiency to field requirements (13) Estimated increased irrigated area by improvement (14) Rate of increased irrigated area to actual irrigated area (15) Estimated total irrigated area (16) Rate of irrigated area to PIA	irements by improv actual irri	ement gated area	. '					

Source: Data were collected from Irrigation Department, Ground Water Department of UP