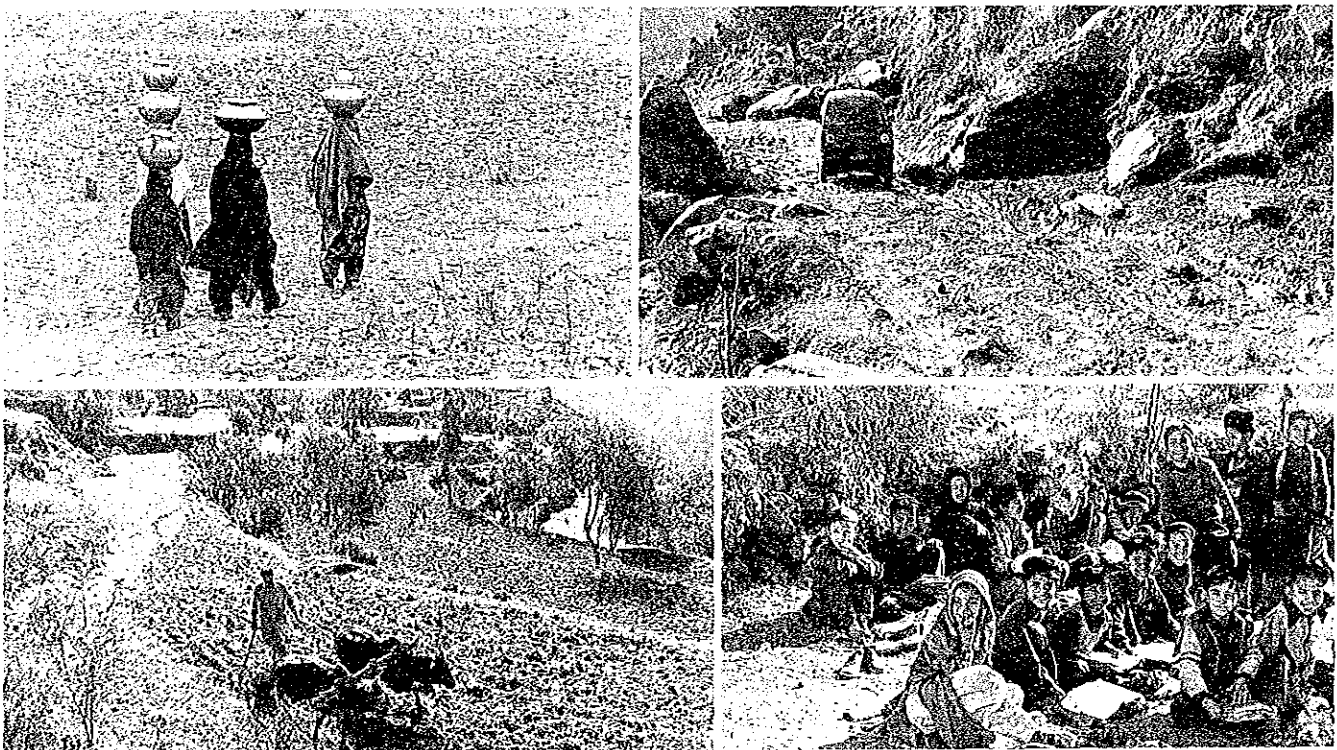


**THE ISLAMIC REPUBLIC OF PAKISTAN**

**MASTER PLAN STUDY  
ON  
SWAT DISTRICT  
INTEGRATED RURAL DEVELOPMENT PROJECT**

**ANNEX**



**FEBRUARY 1990**

**JAPAN INTERNATIONAL COOPERATION AGENCY**

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THE ISLAMIC REPUBLIC OF PAKISTAN

**MASTER PLAN STUDY  
ON  
SWAT DISTRICT  
INTEGRATED RURAL DEVELOPMENT  
PROJECT**

ANNEX

FEBRUARY 1990

JAPAN INTERNATIONAL COOPERATION AGENCY

国際協力事業団

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## CONTENTS

|          |   |
|----------|---|
| ANNEX A. | METEOROLOGY AND HYDROLOGY   |
| ANNEX B. | SOIL AND LAND USE   |
| ANNEX C. | AGRICULTURE AND AGRO-ECONOMY  |
| ANNEX D. | AGRICULTURAL INFRASTRUCTURE   |
| ANNEX E. | RURAL INFRASTRUCTURE  |
| ANNEX F. | RURAL ELECTRIFICATION   |
| ANNEX G. | PROJECT FACILITIES AND COST ESTIMATION                                      |
| ANNEX H. | PROJECT ECONOMY   |
| ANNEX I. | STUDY ON PROPOSED PRIORITY DEVELOPMENT PLANS                                |
| ANNEX J. | COLLECTED DATA AND PAKISTANI GOVERNMENT<br>OFFICIAL CONNECTED BY STUDY TEAM |





## **ANNEX A. METEOROLOGY AND HYDROLOGY**



## CONTENTS

|   | <u>Page</u> |
|---|-------------|
| 1. Meteorological Data .....                        | A-1         |
| 2. Daily Rainfall at Hydrological Design Year ..... | A-2         |
| 3. Probability: 1/5 Year Drought .....              | A-4         |
| 4. Unit River Discharges in the Project Area .....  | A-5         |

## LIST OF TABLES

|   |     |
|---|-----|
| Table A-1 Meteorological Data in Project Area .....                     | A-1 |
| Table A-2 Daily Rainfall at Char Bagh Raingauge<br>Station (1981) ..... | A-2 |
| Table A-3 Daily Rainfall at Karora Raingauge<br>Station (1970) .....    | A-3 |
| Table A-4 List of Annual Rainfall & River Discharge .....               | A-4 |
| Table A-5 Unit Discharge in the Project Area .....                      | A-5 |



TABLE A-1 METEOROLOGICAL DATA IN PROJECT AREA

| ELEMENT       | UNIT    | PLACE        | YEAR    | JAN. | FEB. | MAR. | APR. | MAY | JUN. | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | TOTAL      |          |            |
|---------------|---------|--------------|---------|------|------|------|------|-----|------|------|------|------|------|------|------|------------|----------|------------|
| Temperature   | °C      | Saidu Sharif | 1963-66 | 8    | 11   | 14   | 18   | 22  | 29   | 28   | 27   | 25   | 20   | 10   | 5    | Mean 18    |          |            |
|               |         | Besham       | 1971-72 | 11   | 11   | 17   | 21   | 27  | 30   | 29   | 28   | 28   | 26   | 22   | 18   | 14         | Mean 21  |            |
|               |         | Dagar        | 1971-72 | 7    | 7    | 14   | 19   | 24  | 29   | 29   | 28   | 28   | 24   | 19   | 13   | 8          | Mean 18  |            |
| Rainfall      | mm      | Saidu Sharif | 1963-72 | 51   | 100  | 114  | 110  | 62  | 23   | 130  | 138  | 59   | 49   | 22   | 49   | 907        |          |            |
|               |         | Karora       | 1963-72 | 54   | 159  | 164  | 161  | 68  | 68   | 148  | 104  | 78   | 78   | 62   | 30   | 78         | 1,174    |            |
|               |         | Dagar        | 1963-72 | 93   | 77   | 101  | 83   | 47  | 44   | 139  | 126  | 86   | 86   | 44   | 30   | 43         | 913      |            |
| Humidity      | %       | Saidu Sharif | 1963-66 | 49   | 62   | 65   | 67   | 60  | 60   | 69   | 77   | 70   | 70   | 60   | 45   | 57         | 08: 00hr |            |
|               |         |              | "       | 45   | 49   | 45   | 54   | 42  | 33   | 49   | 54   | 54   | 52   | 47   | 37   | 53         | 17: 00hr |            |
|               |         |              | "       | 47   | 54   | 55   | 61   | 51  | 47   | 59   | 66   | 66   | 61   | 61   | 54   | 41         | 55       | Daily Mean |
|               |         | Besham       | 1970-72 | 60   | 67   | 53   | 65   | 48  | 56   | 69   | 56   | 69   | 77   | 72   | 62   | 56         | 51       | 08: 00hr   |
|               |         |              | "       | 71   | 51   | 45   | 43   | 33  | 37   | 47   | 50   | 47   | 50   | 47   | 42   | 39         | 45       | 17: 00hr   |
|               |         |              | "       | 66   | 59   | 49   | 54   | 41  | 47   | 58   | 64   | 60   | 60   | 60   | 52   | 48         | 48       | Daily Mean |
| Dagar         | 1970-72 | 93           | 91      | 94   | 83   | 56   | 58   | 58  | 76   | 85   | 89   | 89   | 90   | 90   | 88   | 08: 00hr   |          |            |
|               | "       | 67           | 56      | 55   | 47   | 31   | 36   | 53  | 64   | 64   | 53   | 48   | 51   | 59   | 59   | 17: 00hr   |          |            |
|               | "       | 80           | 74      | 75   | 65   | 44   | 47   | 65  | 75   | 75   | 71   | 71   | 69   | 71   | 74   | Daily Mean |          |            |
| Evaporation   | mm      | Saidu Sharif | 1963-66 | 71   | 70   | 133  | 138  | 214 | 451  | 236  | 236  | 192  | 133  | 84   | 62   | 2,020      |          |            |
|               |         | Besham       | 1970-72 | 99   | 99   | 155  | 218  | 335 | 325  | 282  | 268  | 268  | 219  | 178  | 126  | 113        | 2,417    |            |
|               |         | Dagar        | 1970-72 | 40   | 57   | 108  | 169  | 184 | 261  | 273  | 227  | 227  | 164  | 135  | 70   | 40         | 1,728    |            |
| Wind velocity | m/s     | Saidu Sharif | 1963-66 | 10   | 11   | 14   | 12   | 13  | 15   | 12   | 9    | 9    | 10   | 10   | 10   | Mean 11    |          |            |
|               |         | Kalam        | 1963-66 | -    | -    | -    | 15   | 24  | 24   | 37   | 34   | 31   | 31   | 21   | 15   | 3          | Mean 23  |            |
|               |         | Tarbela Dam  | 1961-72 | 31   | 37   | 44   | 44   | 51  | 51   | 44   | 42   | 33   | 33   | 40   | 30   | 24         | Mean 39  |            |

TABLE A-2 DAILY RAINFALL AT CHAR EACH RAINGAUGE STATION (1981)

Unit: (MM/DAY)

| DATE           | JAN.        | FEB.  | MAR.   | APR.   | MAY    | JUN.   | JUL.   | AUG.   | SEP.  | OCT.   | NOV.  | DEC.  | DATE  |
|----------------|-------------|-------|--------|--------|--------|--------|--------|--------|-------|--------|-------|-------|-------|
| 1              | 0.0         | 0.0   | 6.3    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 2.5    | 0.0   | 0.0   | 1     |
| 2              | 0.0         | 0.0   | 0.0    | 0.0    | 0.0    | 0.0    | 14.0   | 0.0    | 0.0   | 7.6    | 0.0   | 0.0   | 2     |
| 3              | 0.0         | 0.0   | 0.0    | 40.6   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   | 3     |
| 4              | 8.9         | 0.0   | 0.0    | 0.0    | 0.0    | 0.0    | 12.7   | 7.6    | 0.0   | 0.0    | 0.0   | 0.0   | 4     |
| 5              | 15.2        | 0.0   | 0.0    | 0.0    | 21.6   | 0.0    | 3.8    | 0.0    | 2.0   | 0.0    | 0.0   | 0.0   | 5     |
| TOTAL          | (24.1)      | (0.0) | (6.3)  | (40.6) | (21.6) | (0.0)  | (30.5) | (7.6)  | (2.0) | (10.2) | (0.0) | (0.0) | TOTAL |
| 6              | 0.0         | 0.0   | 5.1    | 0.0    | 0.0    | 0.0    | 1.3    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   | 6     |
| 7              | 0.0         | 0.0   | 0.0    | 0.0    | 5.8    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   | 7     |
| 8              | 0.0         | 0.0   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 8.9    | 5.1   | 0.0    | 0.0   | 0.0   | 8     |
| 9              | 0.0         | 0.0   | 0.0    | 0.0    | 6.3    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   | 9     |
| 10             | 0.0         | 0.0   | 3.8    | 0.0    | 7.6    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   | 10    |
| TOTAL          | (0.0)       | (0.0) | (8.9)  | (0.0)  | (19.8) | (0.0)  | (1.3)  | (8.9)  | (5.1) | (0.0)  | (0.0) | (0.0) | TOTAL |
| 11             | 0.0         | 0.0   | 1.3    | 0.0    | 0.0    | 12.7   | 0.0    | 0.0    | 0.0   | 0.0    | 6.3   | 0.0   | 11    |
| 12             | 0.0         | 0.0   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 3.8    | 0.0   | 0.0   | 12    |
| 13             | 0.0         | 0.0   | 0.0    | 1.3    | 3.8    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   | 13    |
| 14             | 0.0         | 0.0   | 0.0    | 15.2   | 14.0   | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   | 14    |
| 15             | 0.0         | 0.0   | 3.8    | 10.2   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 5.1    | 0.0   | 0.0   | 15    |
| TOTAL          | (0.0)       | (0.0) | (5.1)  | (26.7) | (17.8) | (12.7) | (0.0)  | (0.0)  | (0.0) | (8.9)  | (6.3) | (0.0) | TOTAL |
| 16             | 0.0         | 0.0   | 8.9    | 0.0    | 0.0    | 0.0    | 19.0   | 0.0    | 0.0   | 6.3    | 0.0   | 0.0   | 16    |
| 17             | 0.0         | 0.0   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   | 17    |
| 18             | 0.0         | 0.0   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 2.5   | 0.0    | 0.0   | 0.0   | 18    |
| 19             | 0.0         | 0.0   | 10.2   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   | 19    |
| 20             | 0.0         | 0.0   | 14.0   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   | 20    |
| TOTAL          | (0.0)       | (0.0) | (33.0) | (0.0)  | (0.0)  | (0.0)  | (19.0) | (0.0)  | (2.5) | (6.3)  | (0.0) | (0.0) | TOTAL |
| 21             | 0.0         | 0.0   | 26.7   | 55.9   | 0.0    | 0.0    | 0.0    | 3.8    | 0.0   | 0.0    | 0.0   | 0.0   | 21    |
| 22             | 0.0         | 0.0   | 3.8    | 10.2   | 0.0    | 0.0    | 14.0   | 10.2   | 0.0   | 0.0    | 0.0   | 0.0   | 22    |
| 23             | 0.0         | 0.0   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   | 23    |
| 24             | 1.3         | 0.0   | 0.0    | 0.0    | 0.0    | 0.0    | 12.2   | 0.0    | 0.0   | 0.0    | 2.5   | 0.0   | 24    |
| 25             | 10.2        | 0.0   | 0.0    | 0.0    | 0.0    | 0.0    | 20.3   | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   | 25    |
| TOTAL          | (11.4)      | (0.0) | (30.5) | (66.0) | (0.0)  | (0.0)  | (46.5) | (14.0) | (0.0) | (0.0)  | (2.5) | (0.0) | TOTAL |
| 26             | 0.0         | 0.0   | 0.0    | 0.0    | 0.0    | 7.6    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   | 26    |
| 27             | 2.5         | 0.0   | 0.0    | 0.0    | 7.6    | 0.0    | 0.0    | 39.4   | 0.0   | 0.0    | 0.0   | 0.0   | 27    |
| 28             | 6.3         | 0.0   | 0.0    | 0.0    | 0.0    | 0.0    | 8.9    | 0.0    | 7.1   | 0.0    | 0.0   | 0.0   | 28    |
| 29             | 0.0         | ****  | 0.0    | 2.5    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 0.0   | 0.0   | 29    |
| 30             | 0.0         | ****  | 12.7   | 3.8    | 0.0    | 0.0    | 3.8    | 11.4   | 0.0   | 0.0    | 0.0   | 0.0   | 30    |
| 31             | 24.1        | ****  | 3.8    | ****   | 0.0    | ****   | 0.0    | ****   | ****  | 0.0    | ****  | 0.0   | 31    |
| TOTAL          | (33.0)      | (0.0) | (16.5) | (6.3)  | (7.6)  | (7.6)  | (12.7) | (50.8) | (0.0) | (7.1)  | (0.0) | (0.0) | TOTAL |
| Rainfall       | 1st 10 days | 24.1  | 0.0    | 15.2   | 40.6   | 41.4   | 0.0    | 31.8   | 16.5  | 7.1    | 10.2  | 0.0   | 0.0   |
|                | 2nd 10 days | 0.0   | 0.0    | 38.1   | 26.7   | 17.8   | 12.7   | 19.0   | 0.0   | 2.5    | 15.2  | 6.3   | 0.0   |
|                | Rest        | 44.4  | 0.0    | 47.0   | 72.3   | 7.6    | 59.2   | 64.8   | 0.0   | 7.1    | 2.5   | 0.0   | 0.0   |
|                | TOTAL       | 68.5  | 0.0    | 100.3  | 139.6  | 66.8   | 20.3   | 110.0  | 81.3  | 9.6    | 32.5  | 8.8   | 0.0   |
| Effective rain | 1st 10 days | 19.3  | 0.0    | 9.1    | 32.5   | 33.0   | 0.0    | 21.4   | 13.2  | 4.1    | 6.1   | 0.0   | 0.0   |
|                | 2nd 10 days | 0.0   | 0.0    | 26.5   | 20.3   | 11.2   | 10.2   | 0.0    | 0.0   | 9.1    | 5.0   | 0.0   | 0.0   |
|                | Rest        | 32.5  | 0.0    | 31.5   | 52.9   | 6.1    | 6.1    | 44.3   | 48.8  | 5.7    | 0.0   | 0.0   | 0.0   |
|                | TOTAL       | 51.8  | 0.0    | 67.1   | 105.7  | 50.3   | 16.3   | 80.9   | 62.0  | 4.1    | 20.9  | 5.0   | 0.0   |

TABLE A-3 DAILY RAINFALL AT KARORA RAINGAUGE STATION (1970)

Unit: (MM/DAY)

| DATE      | JAN.        | FEB.   | MAR.   | APR.   | MAY    | JUNE   | JULY   | AUG.   | SEP.   | OCT.   | NOV.  | DEC.   | DATE  |
|-----------|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|--------|-------|
| 1         | 0.0         | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 1     |
| 2         | 0.0         | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 2     |
| 3         | 0.0         | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 5.1    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 3     |
| 4         | 0.0         | 0.0    | 0.0    | 2.5    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 4     |
| 5         | 0.0         | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 5     |
| TOTAL     | (0.0)       | (0.0)  | (0.0)  | (2.5)  | (0.0)  | (0.0)  | (5.1)  | (0.0)  | (0.0)  | (0.0)  | (0.0) | (0.0)  | TOTAL |
| 6         | 0.0         | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 11.4   | 0.0    | 0.0    | 38.1   | 0.0   | 0.0    | 6     |
| 7         | 0.0         | 0.0    | 0.0    | 0.0    | 8.9    | 0.0    | 7.6    | 0.0    | 0.0    | 16.0   | 0.0   | 0.0    | 7     |
| 8         | 0.0         | 0.0    | 0.0    | 0.0    | 9.7    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 8     |
| 9         | 0.0         | 0.0    | 7.6    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 21.6   | 0.0    | 0.0   | 0.0    | 9     |
| 10        | 0.0         | 0.0    | 15.2   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 10    |
| TOTAL     | (0.0)       | (0.0)  | (22.9) | (0.0)  | (18.5) | (0.0)  | (19.0) | (0.0)  | (21.6) | (54.1) | (0.0) | (0.0)  | TOTAL |
| 11        | 0.0         | 0.0    | 4.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 11    |
| 12        | 0.0         | 0.0    | 12.7   | 0.0    | 0.0    | 5.1    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 12    |
| 13        | 0.0         | 0.0    | 6.6    | 0.0    | 0.0    | 16.5   | 0.0    | 12.7   | 0.0    | 0.0    | 0.0   | 0.0    | 13    |
| 14        | 0.0         | 0.0    | 35.4   | 7.1    | 0.0    | 0.0    | 0.0    | 0.0    | 26.2   | 0.0    | 0.0   | 0.0    | 14    |
| 15        | 0.0         | 0.0    | 33.0   | 0.0    | 0.0    | 0.0    | 0.0    | 7.6    | 0.0    | 0.0    | 0.0   | 0.0    | 15    |
| TOTAL     | (0.0)       | (0.0)  | (81.8) | (7.1)  | (0.0)  | (21.6) | (0.0)  | (12.7) | (33.8) | (0.0)  | (0.0) | (0.0)  | TOTAL |
| 16        | 0.0         | 0.0    | 12.7   | 22.4   | 0.0    | 0.0    | 0.0    | 0.0    | 7.6    | 0.0    | 0.0   | 41.1   | 16    |
| 17        | 0.0         | 0.0    | 6.1    | 0.0    | 0.0    | 0.0    | 0.0    | 2.5    | 17.8   | 0.0    | 0.0   | 0.0    | 17    |
| 18        | 0.0         | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 5.1    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 18    |
| 19        | 0.0         | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 6.3    | 0.0    | 0.0   | 0.0    | 19    |
| 20        | 0.0         | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 8.9    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 20    |
| TOTAL     | (0.0)       | (0.0)  | (18.8) | (22.4) | (0.0)  | (0.0)  | (14.0) | (2.5)  | (31.7) | (0.0)  | (0.0) | (41.1) | TOTAL |
| 21        | 0.0         | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 7.6    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 21    |
| 22        | 0.0         | 0.0    | 0.0    | 0.0    | 5.1    | 5.1    | 15.2   | 0.0    | 0.0    | 14.5   | 0.0   | 0.0    | 22    |
| 23        | 0.0         | 25.4   | 16.3   | 0.0    | 6.3    | 0.0    | 1.3    | 3.0    | 0.0    | 0.0    | 0.0   | 0.0    | 23    |
| 24        | 0.0         | 12.7   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 27.9   | 0.0   | 0.0    | 24    |
| 25        | 10.2        | 25.4   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 25    |
| TOTAL     | (10.2)      | (63.5) | (16.3) | (0.0)  | (11.4) | (5.1)  | (24.1) | (3.0)  | (0.0)  | (42.4) | (0.0) | (0.0)  | TOTAL |
| 26        | 22.9        | 10.2   | 0.0    | 0.0    | 7.6    | 0.0    | 0.0    | 49.5   | 0.0    | 0.0    | 0.0   | 0.0    | 26    |
| 27        | 63.5        | 19.0   | 0.0    | 13.2   | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 27    |
| 28        | 0.0         | 8.9    | 0.0    | 0.0    | 0.0    | 0.0    | 5.1    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 28    |
| 29        | 0.0         | ****   | 0.0    | 0.0    | 0.0    | 6.3    | 5.3    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 29    |
| 30        | 0.0         | ****   | 0.0    | 0.0    | 0.0    | 0.0    | 3.8    | 0.0    | 0.0    | 0.0    | 0.0   | 0.0    | 30    |
| 31        | 0.0         | ****   | 0.0    | ****   | 0.0    | ****   | 5.3    | 0.0    | ****   | 0.0    | ****  | 0.0    | 31    |
| TOTAL     | (86.4)      | (38.1) | (0.0)  | (13.2) | (7.6)  | (6.3)  | (19.6) | (49.5) | (0.0)  | (0.0)  | (0.0) | (0.0)  | TOTAL |
| Rainfall  | 1st 10 days | 0.0    | 0.0    | 22.9   | 2.5    | 18.5   | 0.0    | 24.1   | 0.0    | 21.6   | 54.1  | 0.0    | 0.0   |
|           | 2nd 10 days | 0.0    | 0.0    | 100.6  | 29.5   | 0.0    | 14.0   | 15.2   | 65.5   | 0.0    | 0.0   | 41.1   | 0.0   |
|           | Rest        | 96.6   | 101.6  | 16.3   | 13.2   | 19.0   | 43.7   | 52.5   | 0.0    | 42.4   | 0.0   | 0.0    | 0.0   |
|           | TOTAL       | 96.6   | 101.6  | 139.8  | 45.2   | 37.5   | 81.8   | 67.7   | 87.1   | 96.5   | 0.0   | 41.1   | 828   |
| Effective | 1st 10 days | 0.0    | 0.0    | 18.3   | 0.0    | 14.8   | 0.0    | 19.3   | 0.0    | 17.3   | 43.3  | 0.0    | 0.0   |
|           | 2nd 10 days | 0.0    | 0.0    | 77.3   | 23.6   | 0.0    | 17.3   | 11.2   | 10.2   | 52.4   | 0.0   | 32.9   | 0.0   |
|           | Rest        | 76.5   | 81.3   | 13.0   | 10.6   | 15.2   | 30.8   | 39.6   | 0.0    | 33.9   | 0.0   | 0.0    | 0.0   |
|           | TOTAL       | 76.5   | 81.3   | 108.6  | 34.2   | 30.0   | 61.3   | 49.8   | 69.7   | 77.2   | 0.0   | 32.9   | 648   |

TABLE A-4 LIST OF ANNUAL RAINFALL & RIVER DISCHARGE

| Year                    | Rainfall (mm)  |                    | River Discharge (MCM)      |                       | Remarks                |
|-------------------------|----------------|--------------------|----------------------------|-----------------------|------------------------|
|                         | SWAT CHAR BAGH | SHANGLA PAR KARORA | SWAT R. INTAKE AT AMANDARA | SWAT R. FLOW AT MUNDA |                        |
| Probability<br>1/5 Year | 627            | 839                | 1,332                      | 6,049                 |                        |
|                         | R.P.           | A.R.               | R.P.                       | A.D.                  | R.P. A.D.              |
| 1962                    |                |                    |                            |                       |                        |
| 1963                    | 1,040          | 1,474              | 1,609                      | 4,757                 | R.P.: Return Period    |
| 1964                    | 884            | 1,058              | 1,424                      | 8,088                 | A.R.: Annual Rain      |
| 1965                    | 911            | 1,166              | 1,435                      | 9,261                 | A.D.: Annual Discharge |
| 1966                    | 1,047          | 1,441              | 2.4 1,382                  | -                     |                        |
| 1967                    | 1,070          | 1,234              | 1,403                      | -                     |                        |
| 1968                    | -              | -                  | 1,494                      | -                     |                        |
| 1969                    | 2.9 716        | 1,194              | -                          | -                     |                        |
| 1970                    | 7.9 576        | 828                | 4.3 1,341                  | -                     |                        |
| 1971                    | 176.0 391      | 819                | 11.3 1,295                 | -                     |                        |
| 1972                    | 1,054          | 1,249              | 40.6 1,251                 | 85.4 3,975            |                        |
| 1973                    | 942            | 931                | 1,404                      | 2.5 7,296             |                        |
| 1974                    | 2.0 791        | 787                | 3.0 1,365                  | 7.813                 |                        |
| 1975                    | 1,096          | 1,425              | 4.1 1,344                  | 15.2 4,970            |                        |
| 1976                    | 853            | 1,224              | 2.5 1,380                  | 2.8 6,987             |                        |
| 1977                    | 952            | 1,093              | 3.6 1,352                  | 8,695                 |                        |
| 1978                    | 6.4 599        | 1,070              | 1,415                      | 7,149                 |                        |
| 1979                    | 908            | 693                | 1,442                      | 8,709                 |                        |
| 1980                    | 3.6 675        | 1,161              | 1,399                      | 9,161                 |                        |
| 1981                    | 4.6 638        | 753                | 1,442                      | 8,938                 |                        |
| 1982                    | 860            | 1,361              | -                          | 9,546                 |                        |
| 1983                    | 2.4 761        | 774                | -                          | 6,607                 |                        |
| 1984                    | 27.0 481       | 619                | -                          | 8,325                 |                        |
| 1985                    | -              | -                  | -                          | 8,008                 |                        |
| 1986                    | -              | -                  | -                          | -                     |                        |
| 1987                    | -              | -                  | -                          | -                     |                        |
|                         |                |                    |                            | 10,610                |                        |
|                         |                |                    |                            | 14,304                |                        |



TABLE A-5 UNIT DISCHARGE IN THE PROJECT AREA

1. RUN-OFF PERCENTAGE AT DAGGAR GAUGING STATION IN BARANDU RIVER, BUNER SUB-DIVISION

| Item                           | JAN. | FEB. | MAR. | APR. | MAY | JUN. | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | TOTAL |
|--------------------------------|------|------|------|------|-----|------|------|------|------|------|------|------|-------|
| At Gauging Period (1970 - 72): |      |      |      |      |     |      |      |      |      |      |      |      |       |
| Monthly Mean Rain (mm)         | 70   | 58   | 76   | 62   | 35  | 33   | 104  | 95   | 65   | 33   | 22   | 32   | 685   |
| Monthly Runoff Depth (mm)      | 9    | 10   | 13   | 9    | 8   | 11   | 19   | 22   | 21   | 12   | 10   | 9    | 153   |
| Run-off Percentage (%)         | 13   | 17   | 17   | 15   | 23  | 33   | 18   | 23   | 32   | 36   | 45   | 28   | 22    |

2. MONTHLY MEAN RUN-OFF (UNIT DISCHARGE) IN TEN YEARS (1963-1972)

| Sub-Division | Item                                | JAN. | FEB. | MAR. | APR. | MAY | JUN. | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | TOTAL |
|--------------|-------------------------------------|------|------|------|------|-----|------|------|------|------|------|------|------|-------|
| Swat         | Monthly Rain (mm)                   | 51   | 100  | 114  | 110  | 62  | 23   | 130  | 138  | 59   | 49   | 22   | 49   | 907   |
|              | Run-off Percentage (%)              | 13   | 17   | 17   | 15   | 23  | 33   | 18   | 23   | 32   | 36   | 45   | 28   | 22    |
|              | Run-off Depth (mm)                  | 7    | 17   | 19   | 17   | 14  | 8    | 23   | 32   | 19   | 18   | 10   | 14   | 198   |
|              | Unit Discharge (m <sup>3</sup> /ha) | 70   | 170  | 190  | 170  | 140 | 80   | 230  | 320  | 190  | 180  | 100  | 140  | 1,980 |
| Shangla Par  | Monthly Rain (mm)                   | 54   | 159  | 164  | 161  | 68  | 68   | 148  | 104  | 78   | 62   | 30   | 78   | 1,174 |
|              | Run-off Percentage (%)              | 13   | 17   | 17   | 15   | 23  | 33   | 18   | 23   | 32   | 36   | 45   | 28   | 22    |
|              | Run-off Depth (mm)                  | 7    | 27   | 28   | 24   | 16  | 22   | 27   | 24   | 25   | 22   | 14   | 22   | 258   |
|              | Unit Discharge (m <sup>3</sup> /ha) | 70   | 270  | 280  | 240  | 160 | 220  | 270  | 240  | 250  | 220  | 140  | 220  | 2,580 |
| Buner        | Monthly Rain (mm)                   | 93   | 77   | 101  | 83   | 47  | 44   | 139  | 126  | 86   | 44   | 30   | 43   | 913   |
|              | Run-off Percentage (%)              | 13   | 17   | 17   | 15   | 23  | 33   | 18   | 23   | 32   | 36   | 45   | 28   | 22    |
|              | Run-off Depth (mm)                  | 12   | 13   | 17   | 12   | 11  | 15   | 25   | 29   | 28   | 16   | 14   | 12   | 204   |
|              | Unit Discharge (m <sup>3</sup> /ha) | 120  | 130  | 170  | 120  | 110 | 150  | 250  | 290  | 280  | 160  | 140  | 120  | 2,040 |

3. UNIT DISCHARGE AT DESIGN YEAR (R.P. 1/5 YEAR DROUGHT)

| Sub-Division       | Item                                | JAN. | FEB. | MAR. | APR. | MAY | JUN. | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | TOTAL |
|--------------------|-------------------------------------|------|------|------|------|-----|------|------|------|------|------|------|------|-------|
| Swat (1981)        | Monthly Rain (mm)                   | 69   | 0    | 100  | 140  | 67  | 20   | 110  | 81   | 10   | 33   | 9    | 0    | 638   |
|                    | Run-off Percentage (%)              | 13   | 17   | 17   | 15   | 23  | 33   | 18   | 23   | 32   | 36   | 45   | 28   | 22    |
|                    | Run-off Depth (mm)                  | 9    | 0    | 17   | 21   | 15  | 7    | 20   | 19   | 3    | 12   | 4    | 0    | 127   |
|                    | Unit Discharge (m <sup>3</sup> /ha) | 90   | 0    | 170  | 210  | 150 | 70   | 200  | 190  | 30   | 120  | 40   | 0    | 1,270 |
| Shangla Par (1970) | Monthly Rain (mm)                   | 97   | 102  | 140  | 45   | 38  | 33   | 82   | 68   | 87   | 97   | 0    | 41   | 828   |
|                    | Run-off Percentage (%)              | 13   | 17   | 17   | 15   | 23  | 33   | 18   | 23   | 32   | 36   | 45   | 28   | 22    |
|                    | Run-off Depth (mm)                  | 13   | 17   | 24   | 7    | 9   | 11   | 15   | 16   | 28   | 35   | 0    | 11   | 186   |
|                    | Unit Discharge (m <sup>3</sup> /ha) | 130  | 170  | 240  | 70   | 90  | 110  | 150  | 160  | 280  | 350  | 0    | 110  | 1,860 |
| Buner (1970-72)    | Monthly Rain (mm)                   | 70   | 58   | 76   | 62   | 35  | 33   | 104  | 95   | 65   | 33   | 22   | 32   | 685   |
|                    | Run-off Percentage (%)              | 13   | 17   | 17   | 15   | 23  | 33   | 18   | 23   | 32   | 36   | 45   | 28   | 22    |
|                    | Run-off Depth (mm)                  | 9    | 10   | 13   | 9    | 8   | 11   | 19   | 22   | 21   | 12   | 10   | 9    | 153   |
|                    | Unit Discharge (m <sup>3</sup> /ha) | 90   | 100  | 130  | 90   | 80  | 110  | 190  | 220  | 210  | 120  | 100  | 90   | 1,530 |



## **ANNEX B. SOIL AND LAND USE**



### LIST OF TABLES

|            |  | <u>Page</u> |
|------------|--|-------------|
| Table B-1. | Mapping Units of the Soil Map .....                                      | B-3         |
| Table B-2. | Area of the Soil Mapping Units .....                                     | B-4         |
| Table B-3. | Mapping Units of the Land Capability Map .....                           | B-5         |
| Table B-4. | Area of the Mapping Units in the Land Capability Map                     | B-6         |
| Table B-5. | Area of Swat District and Each Sub-Division by<br>Elevation Groups ..... | B-7         |
| Table B-6. | Area of Cultivated Land by Elevation Groups and<br>Sub-Division .....    | B-8         |

### LIST OF FIGURES

|             |                           |      |
|-------------|---------------------------|------|
| Figure B-1. | Soil Map .....            | B-9  |
| Figure B-2. | Land Capability Map ..... | B-10 |
| Figure B-3. | Land Use Map .....        | B-11 |

## CONTENTS

|  | <u>Page</u> |
|--|-------------|
| CHAPTER I. SOIL AND LAND CAPABILITY .....                                    | B-1         |
| 1.1. Mapping Units of the Soil Map .....                                     | B-1         |
| 1.2. Mapping Units of the Land Capability Map .....                          | B-1         |
| 1.3. Area of Lands by Elevation Groups .....                                 | B-2         |
| <br>   |             |
| CHAPTER II. FERTILIZER EXPERIMENTS ON CEREAL CROPS<br>IN SWAT DISTRICT ..... | B-12        |
| 2.1. Introduction .....  | B-12        |
| 2.2. Wheat .....   | B-12        |
| 2.3. Maize .....   | B-13        |
| 2.4. Rice .....  | B-14        |
| 2.5. Recommendations .....   | B-14        |
| 2.6. Comments on Fertilizer Experiments .....                                | B-14        |
| <br>   |             |
| CHAPTER III. LAND USE .....  | B-15        |
| 3.1. Description of Land Use Pattern .....                                   | B-15        |
| <br>   |             |
| REFERENCES   |             |

## CHAPTER I. SOIL AND LAND CAPABILITY

### 1.1 Mapping Units of the Soil Map

The soil series is the main soil identification unit used in the soil survey of Pakistan. However it is not possible to differentiate individual soil series on the reconnaissance soil maps because of the limited scale of mapping (1:250,000).

The soil associations and soil complexes are used for the mapping unit in the reconnaissance soil map of Swat District. The mapping units of the accompanying soil map were defined by combining those of the soil maps of Swat District. The occurrence, characteristics and area of the mapping units are shown in Table B-1 and Table B-2.

### 1.2. Mapping Units of the Land Capability Map

The land capability classification in Pakistan is designed to suit the conditions of the country. It is similar to the basic structure of the

USDA <sup>1/</sup> classification, but the definitions of the classes have been modified and the number of sub-classes were extended to suit the conditions of Pakistan.

In Pakistan, eight land capability classes are recognized. These classes are numbered from I to VIII. Soils placed in the highest class (I) have the least limitations for agricultural use and relatively little effort is required to produce high yields of a wide range of crops. In lower classes (II to IV), there are increasingly severe limitations and increasingly greater effort is required. Soils in Classes V to VII are generally not suited to cultivation. However, they can be used for range land or forestry. Soils classified under the lowest class (VIII) are not used for any kind of commercial plant and are restricted to recreation, wildlife or water supply use.

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<sup>1/</sup> United States Department of Agriculture

Major limitation to agricultural production is the shortage of moisture in most parts of the country. Therefore, it is necessary first to indicate whether a soil is classified as irrigated or non-irrigated cultivation. Where irrigation is generally practised, the word "irrigated" (ir) is included in the land capability class. Where soils are unfit or where there is no conceivable water supply within the next ten years or so, classification without irrigation (d) has been used.

The characteristics and area of the mapping units of the land capability map are shown in Table B-3 and Table B-4, respectively.

### 1.3. Area of Land by Elevation Groups

The elevation of land is an important factor for land use in Swat District. The area of Swat District and each sub-division by elevation groups which were obtained by using map scaled 1:250,000 are shown in Table B-5 and Table B-6.



TABLE B-1 MAPPING UNITS OF THE SOIL MAP

| Mapping Unit  | Occurrence  | Characteristics <sup>1/</sup>                         | Land Capability |
|---|---|---|-----------------|
| <b>(Mountains)</b>  |   |   |                 |
| 1. Soils from amphibolites and hornblendites                          |   |   |                 |
| { Sw-1, -2 } <sup>2/</sup><br>{ Ta-1 }                                | Upper and steeper parts of mountain slopes                          | Exposed bedrock and gr. SL, shallow                   | Vb<br>Vb        |
| 2. Soils from diorites etc.   |   |   |                 |
| { Sw-4, -5 }<br>{ Ta-3 }  | Upper parts of mountain slopes                                      | Sligh. gr. L~SiL, shallow and exposed bedrock         | Vb<br>Vb        |
| 3. Soils from granites etc.   |   |   |                 |
| { SW-6 }  | Upper parts of mountain slopes                                      | Exposed bedrock and gr. LS, shallow                   | Vb<br>Vb        |
| 4. Soils from granites etc.   |   |   |                 |
| { SW-7, -12, -13, 14 } <sup>2/</sup><br>{ Ta-6, -7 Bu-19 }            | Upper and steeper parts of mountain slopes                          | Exposed bedrock and sligh. gr. L, shallow             | Vb<br>Vb        |
| 5. Soils from limestone and calcareous schists                        |   |   |                 |
| { Sw-8 }<br>{ Ta-12 }   | Upper parts of mountain slopes                                      | Exposed bedrock and gr. L~SiL, shallow                | Vb<br>Vb        |
| 6. Soils from micaceous and silicious schists                         |   |   |                 |
| { Sw-9, -10, -11 }<br>{ Ta-14, -15, -19 Bu-19 }                       | Middle and lower parts of mountain slopes                           | Gr. SiL~SL, shallow to mode, deep and exposed bedrock | Vb<br>Vb<br>III |
| 7. Soils from Swat-Buner schistose group, ultramafic rocks formations |   |   |                 |
| { Sw-3 }<br>{ Ta-22 }   | Upper and lower parts of mountain slopes                            | Gr. L~SiL, shallow and exposed bedrock                | Vb<br>Vb        |
| <b>(Piedmonts)</b>  |   |   |                 |
| 8. Pied mont association  |   |   |                 |
| { Sw-15, Bu-11, -14 }<br>{ Ta-25, -26, -27, -28 }                     | Terraced lands, gently sloping upland                               | gr. SL~CL   | d III<br>d IV   |
| <b>(Loess Plains)</b>   |   |   |                 |
| 9. Loess association  |   |   |                 |
| { Sw-25, -26, Bu-5 }<br>{ Ta-32, -33 }                                | Table lands, nearly level to gently sloping                         | SiL~SiCL, Deep  | d III<br>ir II  |
| 10. Water reworked loess association                                  |   |   |                 |
| { Sw-27, Ta-37, -39 }   | Main part of the plains and valleys gently sloping to nearly level  | SiL~SiCL, Deep  | ir II<br>d III  |
| <b>(Alluvial Plains)</b>  |   |   |                 |
| 11. Silty soils association   |   |   |                 |
| { SW-17, -23 -24 }<br>{ Ta-43 }                                       | Main parts of the plains gently sloping                             | SiL~SiCL, Deep to mode. deep                          | ir I ~ II<br>VI |
| 12. Loamy soils association   |   |   |                 |
| { Sw-16, -18, -19, -20 }  | Main parts of the plains, terraced lands, gently sloping to sloping | L~SL, Deep  | II ~ III        |

<sup>1/</sup> gr.-gravelly, sligh.-slightly, mode.-moderately, LS-Loamy sand, SL-Sandy loam, SiL-SiLT loam, L-Loam, CL-Clay loam SiCL-Silty clay loam.

<sup>2/</sup> Mapping units in the soil maps of the Reconnaissance Soil Survey of Swat Chatchment (1976), Tarbela Watershed (1976), Buner Valley (1975); Soil Survey of Pakistan.

TABLE B-2 AREA OF THE SOIL MAPPING UNITS <sup>1/</sup>

| Mapping <sup>2/</sup><br>Unit | Mountains |       |     | Pied-<br>monts | Loess<br>Plains | Alluvial<br>Plains | Glacier | Others | Total |     |     |     |     |      |       |                 |                 |      |  |
|-------------------------------|-----------|-------|-----|----------------|-----------------|--------------------|---------|--------|-------|-----|-----|-----|-----|------|-------|-----------------|-----------------|------|--|
|                               | (1)       | (2)   | (3) |                |                 |                    |         |        |       | (4) | (5) | (6) | (7) | (8)  | (9)   | (10)            | (11)            | (12) |  |
| Sub<br>-Division              |           |       |     |                |                 |                    |         |        |       |     |     |     |     |      |       |                 |                 |      |  |
| Swat                          | 578       | 1,958 | 66  | 1,650          | 194             | 210                | 101     | 33     | 113   | 22  | 112 | 83  | 280 | 52   | 5,452 | km <sup>2</sup> |                 |      |  |
|                               | 10.6      | 35.8  | 1.2 | 30.2           | 3.6             | 3.9                | 1.9     | 0.6    | 2.1   | 0.4 | 2.1 | 1.5 | 5.1 | 1.0  | 100.0 | %               |                 |      |  |
| Shangla Par                   | 24        | 255   |     | 271            |                 | 790                | 109     |        |       |     |     |     |     |      |       | 1,480           | km <sup>2</sup> |      |  |
|                               | 1.7       | 17.3  |     | 18.3           |                 | 53.4               | 7.3     |        |       |     |     |     |     |      |       | 100.0           | %               |      |  |
| Buner                         |           | 7     |     | 395            | 371             | 603                | 3       | 133    | 264   | 5   | 65  |     |     | 10.0 | 1,856 | km <sup>2</sup> |                 |      |  |
|                               |           | 0.4   |     | 21.2           | 20.0            | 32.5               | 0.2     | 7.2    | 14.2  | 0.3 | 3.5 |     |     | 0.5  | 100.0 | %               |                 |      |  |
| Swat District                 | 602       | 2,220 | 66  | 2,316          | 565             | 1,603              | 213     | 166    | 377   | 48  | 177 | 83  | 280 | 72   | 8,788 | km <sup>2</sup> |                 |      |  |
|                               | 6.9       | 25.3  | 0.7 | 26.4           | 6.4             | 18.3               | 2.4     | 1.9    | 4.3   | 0.5 | 2.0 | 0.9 | 3.2 | 0.8  | 100.0 | %               |                 |      |  |

<sup>1/</sup> Measurement of the mapping units on the soil map (scale 1 : 250,000)

<sup>2/</sup> See Table B-1

TABLE B-3 MAPPING UNITS OF THE LAND CAPABILITY MAP

| Mapping Unit <sup>1/</sup>                           | Slope, Drainage, Soil depth <sup>2/</sup>   | Soil texture <sup>3/</sup>                          |
|--|---|---|
| 1. Lands with a very high potential under irrigation |   |   |
| Sw-1 (ir I , ir II)                                  | Nearly level to gently sloping well to somewhat excess. drained   | Silty to loamy soils                                |
| 2. Lands with a high potential under irrigation      |   |   |
| Sw-2 (ir II )  | Gently sloping well to somewhat excess. drained   | Loamy soils   |
| Sw-3 (ir II , dIII)                                  | — do —  | Silty to grav. sandy soils                          |
| Ta-3 (ir II , ir I )                                 | Gently sloping to level, well drained   | Silty to fine loamy soils                           |
| Ta-4 (ir II , dIII)                                  | Sloping to nearly level somewhat excess. drained  | Sligh. grav. fine lomy to silty soils               |
| 3. Lands with a moderate potential under irrigation  |   |   |
| Sw-4 (ir III)  | Sloping to mode. steep, terraced, well to imperfectly drained   | Loamy soils   |
| Sw-5 (ir III , ir IV)                                | Gently sloping, mode. deep to shallow, excess. drained  | Sandy soils over gravel and stones.                 |
| 4. Lands with a moderate potential under dry-farming |   |   |
| Sw-6 (dIII)  | Sloping to gently sloping   | Silty to somewhat sandy soils                       |
| Sw-7 (dIII , dIV)                                    | Gently sloping, excess. drained, mode. deep to shallow  | Sligh. grav. somewhat sandy to loamy soils          |
| Sw-8 (dIII , VII)                                    | Sloping to mode. steep, excess. drained, mode. deep and exposed bedrock nearly level to sloping, well drained | Somewhat sandy, loamy and silty soils               |
| Ta-7 (dIII)  | Nearly level to sloping, well drained   | Silty, loamy and clayey soils with humified surface |
| Ta-8 (dIII , dIV)                                    | Nearly level to sloping, mode. deep to shallow  | Fine loamy to silty soils                           |
| Ta-10 (dIII , VII)                                   | Sloping to steep, mode. deep and exposed bedrock  | Silty, loamy and grav. loamy soils                  |
| 5. lands with a low potential under dry-farming      |   |   |
| Ta-12 (dIV , VII , dIII)                             | Steep to gently sloping mode. deep and exposed bedrock.   | Grav. loamy and loamy soils                         |
| Ta-15 (VII , dIV)                                    | Sloping, exposed bedrock and shallow soil depth   | Grav. loamy and very grav. sandy soils              |
| 6. Lands with a fair potential for timber            |   |   |
| Sw-9 (VI , VII , dIII)                               | Steep, mode. deep and exposed bedrock   | Grav. silty soils                                   |
| Ta-16 (VII , VI)                                     | Steep, exposed bedrock and shallow soil depth   | Slightly grav. silty to loamy soils                 |
| Ta-18 (VII , VI , VII)                               | Steep, exposed bedrock and mode. deep to shallow  | Grav. silty, loamy and somewhat sandy soils         |
| 7. Lands with a poor potential for timber            |   |   |
| Sw-11 (VI , VII) }<br>Ta-14 (V , VII) }              | Steep to very steep, shallow and exposed bedrock  | Grav. silty, loamy and somewhat sandy soils.        |
| 8. Lands with a fair potential for range             |   |   |
| Sw-10 (VI , VII , dIII)                              | Steep, mode. deep and exposed bedrock   | Grav. silty soils                                   |
| Ta-13 (VII , dIII , dIV)                             | Sloping to gently sloping well drained, including gullied land  | Silty and clayey soils                              |
| 9. Lands with a poor potential for range             |   |   |
| Ta-12 (VI , VII)                                     | Steep to very steep, shallow and exposed bedrock.   | Grav. silty, loamy and sandy soils                  |
| Ta-9 (VII , VI , VII)                                | Steep, mode. deep to shallow and exposed bedrock  | Grav. silty and loamy soils, somewhat sandy soils   |
| 10. Agriculturally unproductive lands                |   |   |
| Sw-13 (VII , VII ) }<br>Sw-14 (VII , VII ) }         | Steep to very steep, exposed bedrock and steeply dissected area, shallow                                      | Grav. loamy to sandy soils                          |
| Ta-17 (VII , VI)                                     | Steep, exposed bedrock and shallow  | Grav. loamy and silty soils                         |
| Ta-20 (VII , VI , VI)                                | Very steep to steep, exposed bedrock and shallow  | Grav. silty, loamy and sandy soils                  |
| Ta-21 (VII , VI , VI)                                | Vary steep to steep, exposed bedrock and shallow  | Grav. loamy and sandy soils                         |

1/ Sw-1 — Mapping unit on the Land Capability Map of Swat Catchment area  
Ta-3 — Mapping unit on the Land Capability Map of Tarbela Watershed area

2/ excess. — excessively, mode. — moderately

3/ grav. — gravelly, sligh. — slightly

TABLE B-4 AREA OF THE MAPPING UNITS IN THE LAND CAPABILITY MAP

| Sub-division  | Mapping unit | Lands under Irrigation |             | Lands under Dry-Farming |              | Lands for Timber |             | Lands for Range |             | Glacier     | Others               | Total |
|---------------|--------------|------------------------|-------------|-------------------------|--------------|------------------|-------------|-----------------|-------------|-------------|----------------------|-------|
|               |              | (1)                    | (2)         | (3)                     | (4)          | (5)              | (6)         | (7)             | (8)         |             |                      |       |
|               |              | Very High Poten.       | High Poten. | High Mode. Poten.       | Mode. Poten. | Low Poten.       | Fair Poten. | Poor Poten.     | Fair Poten. | Poor Poten. | Agric. unprod. Lands |       |
| Swat          |              | 110                    | 101         | 14                      | 239          | 279              | 1,275       | 132             | 1,090       | 1,880       | 280                  | 52    |
|               |              | 2.0                    | 1.8         | 0.3                     | 4.4          | 5.1              | 23.4        | 2.4             | 20.0        | 34.5        | 5.1                  | 1.0   |
| Shangla Par   |              |                        |             |                         | 148          | 527              | 178         |                 | 131         | 395         |                      | 10    |
|               |              |                        |             |                         | 10.0         | 35.7             | 12.0        |                 | 8.8         | 26.8        |                      | 0.6   |
| Buner         |              |                        | 73          |                         | 167          | 184              | 2           | 181             | 416         | 489         |                      |       |
|               |              |                        | 3.9         |                         | 9.0          | 9.9              | 0.1         | 10.0            | 22.3        | 26.3        |                      |       |
| Swat District |              | 110                    | 174         | 14                      | 554          | 275              | 1,150       | 313             | 1,637       | 2,764       | 280                  | 62    |
|               |              | 1.3                    | 2.0         | 0.2                     | 6.3          | 3.1              | 13.1        | 3.6             | 18.6        | 31.4        | 3.2                  | 0.7   |

1/ Measurement of the mapping units on the land capability map (scale 1 : 250,000)

2/ See Table B-3

3/ Agriculturally unproductive lands

TABLE B-5 AREA OF THE SOIL MAPPING UNITS <sup>1/</sup>

| Sub-<br>Division | Eleva-<br>-tion |               | 2,000         |               | 4,000         |  | 6,000 |  | Total                            |  |
|------------------|-----------------|---------------|---------------|---------------|---------------|--|-------|--|----------------------------------|--|
|                  | < 2,000 ft      | ~4,000 ft     | ~6,000 ft     | ~8,000 ft     | > 8000 ft     |  |       |  |                                  |  |
| Swat             |                 | 677<br>12.4   | 911<br>16.7   | 769<br>14.1   | 3,095<br>56.8 |  |       |  | 5,452 km <sup>2</sup><br>100.0 % |  |
| Shangla Par      |                 | 319<br>21.5   | 506<br>34.2   | 417<br>28.2   | 238<br>16.1   |  |       |  | 1,480 km <sup>2</sup><br>100.0 % |  |
| Buner            | 203<br>10.9     | 1,161<br>62.6 | 402<br>21.7   | 86<br>4.6     | 4<br>0.2      |  |       |  | 1,856 km <sup>2</sup><br>100.0 % |  |
| Swat District    | 203<br>2.3      | 2,157<br>24.6 | 1,819<br>20.7 | 1,272<br>14.5 | 3,337<br>37.9 |  |       |  | 8,788 km <sup>2</sup><br>100.0 % |  |

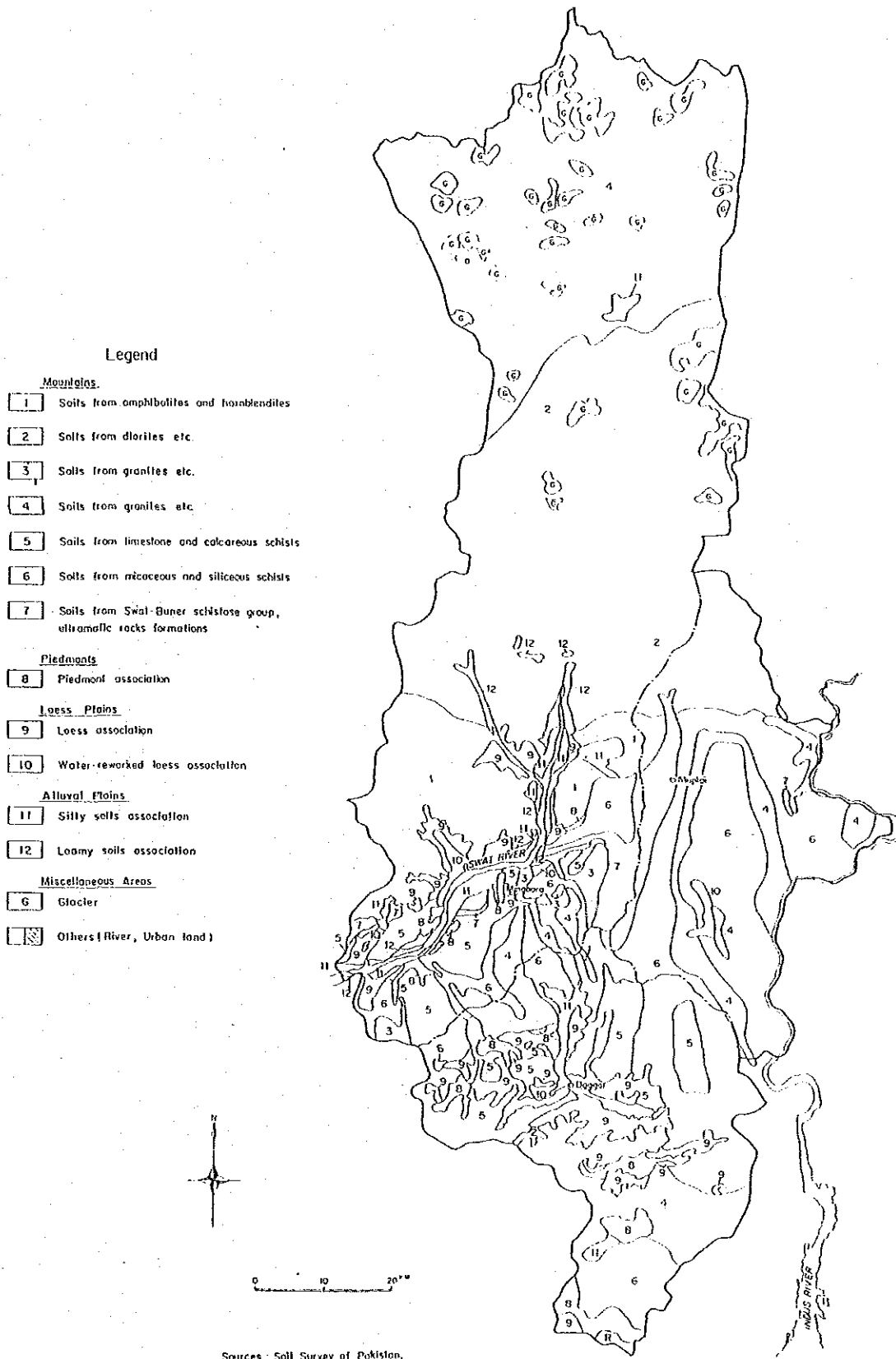
<sup>1/</sup> Measurement of the contour map (scale 1 : 250,000)

TABLE B-6 AREA OF CULTIVATED LAND BY ELEVATION GROUPS AND SUB-DIVISION

|               | Total            | Cultivated Land           |                         | Sub-total                                       |
|---------------|------------------|---------------------------|-------------------------|---|
|               |                  | < 4,000 ft                | > 4,000 ft              |   |
| Swat          | 5,452<br>(100.0) | 403<br>( 7.4)<br>(40.7)   | 588<br>(20.8)<br>(59.3) | 991 km <sup>2</sup><br>( 18.2) %<br>(100.0) %   |
| Shangla Par   | 1,480<br>(100.0) | 163<br>(11.0)<br>(39.3)   | 252<br>(17.0)<br>(60.7) | 415 km <sup>2</sup><br>( 28.0) %<br>(100.0) %   |
| Buner         | 1,856<br>(100.0) | 540<br>(29.1)<br>(97.8)   | 12<br>(0.1)<br>(2.2)    | 552 km <sup>2</sup><br>( 22.3) %<br>(100.0) %   |
| Swat District | 8,788<br>(100.0) | 1,106<br>(12.6)<br>(56.5) | 852<br>( 9.7)<br>(43.5) | 1,958 km <sup>2</sup><br>( 22.3) %<br>(100.0) % |

1/ Measurement of the contour map (scale 1 : 250,000) and the distribution map of cultivated land (scale 1 : 250,000) originating from the topographic maps (scale 1 : 50,000)

FIGURE B-1 SOIL MAP



**Legend**

Mountains

- 1 Soils from amphibolites and hornblendites
- 2 Soils from diorites etc.
- 3 Soils from granites etc.
- 4 Soils from granites etc.
- 5 Soils from limestone and calcareous schists
- 6 Soils from micaceous and siliceous schists
- 7 Soils from Swat-Buner schistose group, ultramafic rocks formations

Piedmonts

- 8 Piedmont association

Loess Plains

- 9 Loess association
- 10 Water-reworked loess association

Alluvial Plains

- 11 Silty soils association
- 12 Loamy soils association

Miscellaneous Areas

- 6 Glacier
- Others (River, Urban land)

Sources: Soil Survey of Pakistan,  
 Reconnaissance Soil Survey  
 -Buner Valley (1975),  
 -Swat Catchment (1976),  
 -Torbela Watershed (1976)

FIGURE B-2 LAND CAPABILITY MAP

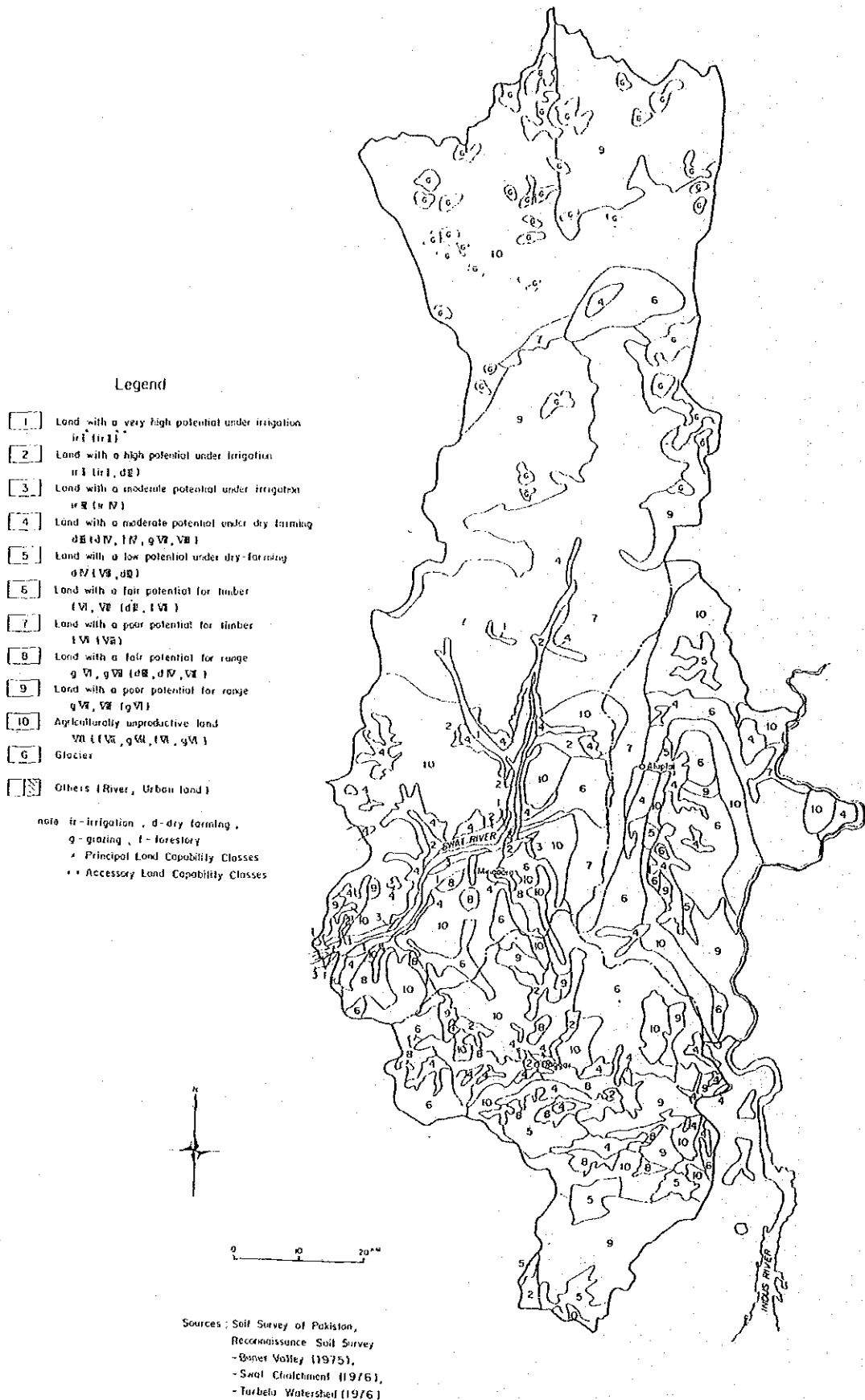
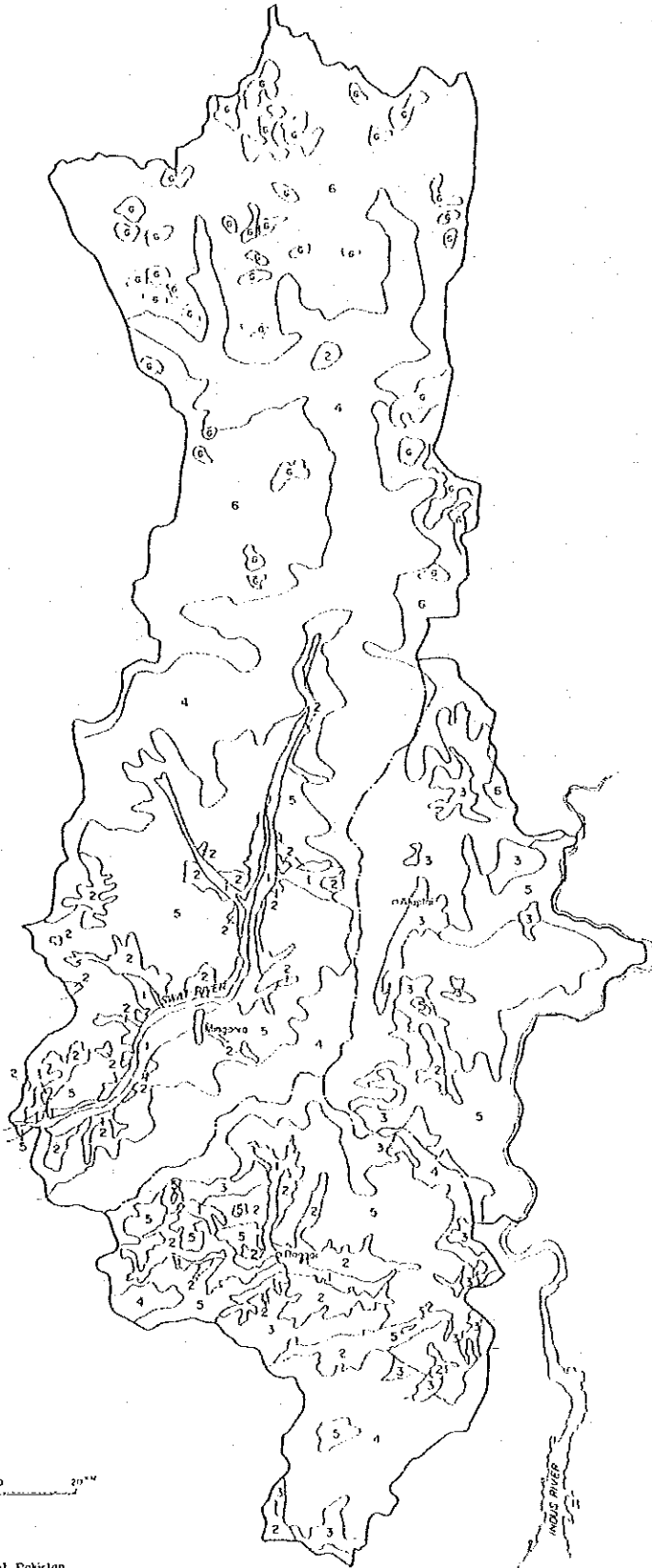




FIGURE B-3 LAND USE MAP

- Legend
- 1 Cropping with irrigation
  - 2 Restricted cropping under dry-farming
  - 3 Restricted cropping under dry-farming with little grazing and coniferous forest
  - 4 Timber forest
  - 5 Grazing and firewood
  - 6 Seasonal grazing (Alpine pasture)
  - G Glacier
  - Others (River, Urban land)



Sources: Soil Survey of Pakistan,  
 Reconnaissance Soil Survey  
 - Buner Valley (1975),  
 - Swat Catchment (1976),  
 - Tarbela Watershed (1976)



## CHAPTER II. FERTILIZER EXPERIMENTS ON CEREAL CROPS IN SWAT DISTRICT <sup>1/</sup>

### 2.1. Introduction

The Department of Agriculture conducted the fertilizer experiments on wheat, maize and rice in Swat District during the period of 1971/72 to 1981/82.

The main objectives of the experiments are as follows:

- To assess the original fertility status of the soils
- To recommend the proper methods of fertilizer application and popularize the use of mineral fertilizer among the farmers.

Experimental trials were carried out on many farmers' fields in five Tehsils of the District; namely, Saidu Sharif, Barikot, Khawazakhela, Matta, and Daggar. The total number of trials in the District was 906.

The soils of the fields used for experiments were of moderately coarse to moderately fine-textured, neutral to strongly alkaline and well drained soils.

### 2.2. Wheat

The average yields obtained by farmers in the area were 1,524 kg/ha and 703 kg/ha under irrigated and Barani conditions, respectively. The results of the experiments show that the yields were more than 5,000 kg/ha under irrigated and more than 3,000 kg/ha under the Barani conditions when fertilizers are used, as shown below:

---

<sup>1/</sup> Source: H.Rehman, A.Bhatti, B.Aimin and A.H.Raja, "Fertilizer Experiment on Cereal Crops" Agricultural Research Institute, Tarnab, Peshawar ,NWFP in 1983.

| Treatment(kg/ha) |                               |                  | Yield 1/ Variety (kg/ha) |             |       |
|------------------|-------------------------------|------------------|--------------------------|-------------|-------|
| N                | P <sub>2</sub> O <sub>5</sub> | K <sub>2</sub> O | Mexipak                  | Blue Silver | Local |
| <u>Irrigated</u> |                               |                  |                          |             |       |
| 0                | 0                             | 0                | 1,036                    | 1,137       | 1,234 |
| 80               | 80                            | 0                | 2,830                    | 2,437       | 2,000 |
| 120              | 80                            | 0                | 4,243                    | 2,643       | 1,280 |
| 160              | 80                            | 0                | 5,053                    | 3,072       | 2,850 |
| <u>Barani</u>    |                               |                  |                          |             |       |
| 0                | 0                             | 0                | 1,035                    | 1,135       | 938   |
| 90               | 40                            | 0                | 3,005                    | 3,045       | 2,032 |
| 120              | 40                            | 0                | 3,232                    | 3,132       | 2,545 |
| 150              | 40                            | 0                | 3,255                    | 3,145       | 2,625 |

1/ Yields are average of trials.

### 2.3. Maize

The average yield of maize was about 1,400 kg/ha under irrigated cultivation, while in the trials the yields have increased to more than 4,000 kg/ha.

| Treatment(kg/ha) |                               |                  | Yield 2/ Variety (kg/ha) |       |
|------------------|-------------------------------|------------------|--------------------------|-------|
| N                | P <sub>2</sub> O <sub>5</sub> | K <sub>2</sub> O | Synthetic                |       |
| 0                | 0                             | 0                | 1,072                    |       |
| 120              | 60                            | 0                | 4,260                    |       |
| 180              | 60                            | 0                | 4,580                    |       |
| 180              | 120                           | 0                | 4,860                    |       |
|                  |                               |                  | Changez                  | Zia   |
| 0                | 0                             | 0                | 1,053                    | 1,111 |
| 120              | 60                            | 0                | 3,035                    | 3,445 |
| 150              | 60                            | 0                | 3,245                    | 4,542 |
| 150              | 120                           | 0                | 4,548                    | 4,544 |

2/ Average of trials

## 2.4. Rice

When fertilizers were used, the yields have registered to more than 5,000 kg/ha in some case as against the farmer's average yield 1,450 kg/ha. In some varieties, the yields were quadrupled or more due to the use of fertilizers.

| Treatment(kg/ha) |                               |                  | Yield <sup>1/</sup> , Variety(kg/ha) |       |       |
|------------------|-------------------------------|------------------|--------------------------------------|-------|-------|
| N                | P <sub>2</sub> O <sub>5</sub> | K <sub>2</sub> O | IRRI-6                               | JP-5  | Local |
| 0                | 0                             | 0                | 1,435                                | 1,135 | 1,009 |
| 60               | 60                            | 0                | 2,005                                | 1,835 | 1,648 |
| 90               | 60                            | 0                | 3,246                                | 2,293 | 2,008 |
| 120              | 60                            | 0                | 3,940                                | 4,037 | 2,434 |
| 150              | 60                            | 0                | 6,072                                | 5,263 | 2,625 |

<sup>1/</sup> Average of trials

## 2.5. Recommendations

On the basis of experimental results, the Department of Agriculture has made recommendations for the farmers and extension workers to boost up rice production in Swat District.

## 2.6. Comments on the Fertilizer Experiments

Crop yields have increased due to use of fertilizers, ignoring the other input factors. The crop yields were determined by a number of factors such as climate, soil, variety, cultivation method, etc. A single factor at an optimum level does not cause higher and sustained increase in yield.

It is essential to adopt not a single technique but the improved package of technology. In order to acquaint the farmers, especially the small farmers with the latest technology, promotion of the agricultural research and extension work is necessary. Agricultural Technology Transfer and Demonstration Farm are expected to play an important role in this regard.



## CHAPTER III. LAND USE

### 3.1. Descriptions of Land Use Pattern

The land in the Project Area is used in different manner depending upon elevation, slope, climate, soil properties, relief, water supply and socio-economic conditions.

The following mapping units are used in the land use map:

- 1) Cropping with irrigation
- 2) Restricted cropping under dry-farming
- 3) Restricted cropping under dry-farming with little grazing and coniferous forest
- 4) Timber forest
- 5) Grazing and firewood
- 6) Seasonal grazing (Alpine pasture)
- 7) Glacier
- 8) Others

#### 1) Cropping with Irrigation

This mapping unit covers almost flat to gently sloping, well to moderately well-drained areas composed of medium and moderately fine textured soils. It occurs along the Swat River in the southern part of the valley and on the flood plains of the streams in Buner. Elevations of both areas are below 1,200 m.

Irrigation water used for common cropping is provided by uncontrolled diversion channels, canals, open wells, tubewells and springs.

The main kharif crops are maize and rice. Wheat and fodders are the most common rabi crops. Other important crops are tobacco, pulses, oil-seeds and barley. The growth of vegetables, fodders and orchards are the major land use around the main towns. Among the vegetables, tomato and onion are mostly common and exported outside the Project area. Citrus, apple and walnut are valuable fruits, followed by peach, apricot

and plum. These vegetables and fruits give considerable economic returns to the farmers.

The management level of crop cultivation ranges from low to moderate, and yields are generally moderate. The uses of fertilizers and improved crop varieties are gradually increasing.

## 2) Restricted Cropping under Dry-Farming

This unit covers flat to sloping, well to excessively drained areas of medium to moderately coarse textured soils. It occurs mainly in the southern part of Swat Sub-division and the central part of Buner Sub-division. The land is used for restricted dry-farming. Wheat, oil-seeds and maize are main crops grown in flat area, and potato and maize are cropped on the higher parts of mountain slopes.

The management level of crop cultivation is low and yields are moderate. Shortage of moisture, soil erosion, relief, snow fall and traditional management are the major factors affecting crop yields.

## 3) Restricted Cropping under Dry-Farming with Little Grazing and Coniferous Forest

This unit covers sloping to moderately steep slopes and lower parts of the mountains. The soils are generally shallow to moderately deep, medium to coarse textured and well to excessively drained. The lands are usually terraced with little care towards their proper maintenance. They occur in Buner and Shangla Par and generally have an elevation of less than 2,000 meters.

Wheat is the main winter crop while maize and potato are main summer crops. The slopes are often steep, from where soil is readily washed away due to heavy rainfalls. After a few years, such lands are abandoned and fresh lands are brought under cultivation. These lands have a low suitability for agricultural use. The uncultivated parts in the unit provide grazing or forest.



#### 4) Timber Forest

This unit covers mountainous lands generally between 1,100 and 3,300 meters elevation and occupies wide range of slopes. The soils are excessively drained, medium to coarse textured and shallow to moderately deep soils.

The area has a sub-humid to humid temperate climate and is covered with fairly dense forest. Forest plays an important role for controlling soil erosion and provides recreational sites and wildlife habitats.

#### 5) Grazing and Firewood

This unit is quite extensive and occupies mountain slopes below 3,300 m elevation. It comprises sloping to steep mountain slopes and consists of excessively drained, shallow to moderately deep, gravelly medium to coarse textured soils. The land grows from sparse to moderate vegetative cover of native grasses and shrubs. They provide poor to moderate grazing throughout the year and fuels for local people. Overgrazing, ruthless cutting and extensive clearance of land for cultivation have severely damaged the quality and density of the vegetation.

#### 6) Seasonal Grazing (Alpine Pasture)

Seasonal grazing extensively occupies a wide range of slopes between 3,300 and 5,200 meters elevation in the northern part of the Area. The land consists of excessively drained, shallow to moderately deep, medium to coarse textured soils.

It occurs above the tree limit and remains under snow for major part of the year. The area is covered with natural meadows that provide good seasonal grazing during summer.

At present, alpine pasture is under heavy grazing by the large herds of cattle during summer every year. Thus overgrazing and cutting of the meadows should be controlled for sustained seasonal grazing.

References:

- 1) Soil Survey of Pakistan, 1975, Reconnaissance Soil Survey of Buner Valley.
- 2) 1976, Reconnaissance Soil Survey of Swat Catchment.
- 3) 1976, Reconnaissance Soil Survey of Tarbela Watershed.
- 4) H.Rehman, A.Bhatti, B. Amin and A.H. Raja, 1983. Fertilizer Experiment on Cereal Crops.Agricultural Research Institute, Tarnab, Peshawar,NWFP
- 5) H.Rehman, 1987, Concept for Upgradation of Agricultural Research Station Mingora, Swat to the Status of Agricultural Research Institute.

## **ANNEX C. AGRICULTURE AND AGRO-ECONOMY**



## CONTENTS

|  | <u>PAGE</u> |
|--|-------------|
| CHAPTER I PRESENT AGRICULTURE .....                          | C-1         |
| 1.1 Farm size and progress of Land Reform .....              | C-1         |
| 1.2 Land Use .....   | C-2         |
| 1.3 Crop Production .....                                    | C-2         |
| 1.4 Supply of Crop loan and Farm Inputs .....                | C-3         |
| 1.5 Farm Mechanization .....                                 | C-3         |
| 1.6 Animal Husbandry .....                                   | C-4         |
| <br>   |             |
| CHAPTER II AGRICULTURAL DEVELOPMENT<br>SUPPORTING PLAN ..... | C-5         |
| 2.1 Proposed Cropping Pattern .....                          | C-5         |
| 2.2 Target Yield of Crops .....                              | C-5         |
| 2.3 Proposed Agricultural Supporting Facilities .....        | C-6         |
| <br>   |             |
| CHAPTER III PRESENT AGRICULTURE IN<br>SIRDP AREA .....       | C-7         |
| <br>   |             |
| CHAPTER IV MARKETING PLAN .....                              | C-8         |

## LIST OF TABLES

|            | <u>Page</u>   |
|------------|---|
| Table C-1  | Number of Farms by Size in Swat District ..... C-9                    |
| Table C-2  | Result of Land Reform in Swat-District ..... C-10                     |
| Table C-3  | Estimated Number of Farm Household<br>and Farm Size (1988) ..... C-11 |
| Table C-4  | Land Use by Sub-Tehsil ..... C-12                                     |
| Table C-5  | Summary of Crop Production Data<br>(1983/84 to 1987/88) ..... C-12    |
| Table C-6  | Crop Production, Maize ..... C-14                                     |
| Table C-7  | Crop Production, Rice ..... C-15                                      |
| Table C-8  | Crop Production, Mong (Black Gram) ..... C-16                         |
| Table C-9  | Crop Production, Potato ..... C-17                                    |
| Table C-10 | Crop Production, Sucarcane ..... C-18                                 |
| Table C-11 | Crop Production, Apple ..... C-19                                     |
| Table C-12 | Crop Production, Apricot ..... C-20                                   |
| Table C-13 | Crop Production, Plum ..... C-21                                      |
| Table C-14 | Crop Production, Pears ..... C-22                                     |
| Table C-15 | Crop Production, Wheat ..... C-23                                     |
| Table C-16 | Crop Production, Barley ..... C-24                                    |
| Table C-17 | Crop Production, Rape and Mustard ..... C-25                          |
| Table C-18 | Crop Production, Onion ..... C-26                                     |
| Table C-19 | Crop Production, Citrus Fruit ..... C-27                              |

|            |   |      |
|------------|---|------|
| Table C-20 | Summary on Crop Yield in the Project Area .....   | C-28 |
| Table C-21 | Crop Production in Swat District (1) .....  | C-29 |
| Table C-22 | Crop Production in Swat District (2) .....  | C-30 |
| Table C-23 | Cropped Area and Cropping Intensity (1986/87)<br>(Swat Sub-Division) .....                        | C-31 |
| Table C-24 | Cropped Area and Cropping Intensity (1986/87)<br>(Shangla Par Sub-Division) .....                 | C-32 |
| Table C-25 | Cropped Area and Cropping Intensity (1986/87)<br>(Buner Sub-Division) .....                       | C-33 |
| Table C-26 | Distribution of Crop Loan through Agricultural<br>Cooperative (1987-87) .....                     | C-34 |
| Table C-27 | Distribution of Agricultural Inputs and Farm<br>Machinery through Agricultural Cooperatives ..... | C-34 |
| Table C-28 | Distribution of Improved Seeds and Fruit<br>Samplings in Swat District .....                      | C-35 |
| Table C-29 | Off-Take of Fertilizer in swat District .....   | C-35 |
| Table C-30 | Number of Agricultural Machinery<br>by Sub-Division (1989) .....                                  | C-36 |
| Table C-31 | Estimated Livestock Population (1988) .....   | C-37 |
| Table C-32 | Number of Veterinary Facilities .....   | C-38 |
| Table C-33 | Annual Nutrient Requirement .....   | C-39 |
| Table C-34 | Fish Production .....   | C-40 |
| Table C-35 | Proposed Cropping Pattern and Intensity .....   | C-41 |
| Table C-36 | Target Yield (Barani to Barani) .....   | C-42 |
| Table C-37 | Target Yield (Barani to Irrigated) .....  | C-43 |
| Table C-38 | Target Yield (Irrigated to Irrigated) .....   | C-44 |

|            |  |      |
|------------|--|------|
| Table C-39 | Quantity of Agricultural Supporting Facilities .....                                 | C-45 |
| Table C-40 | Proposed Agricultural Supporting Facilities by<br>Term of Plan .....                 | C-51 |
| Table C-41 | Location of Agricultural Supporting Facilities<br>(Long Term Development Plan) ..... | C-52 |
| Table C-42 | Agricultural Supporting Facilities Schemes .....                                     | C-53 |
| Table C-43 | Land Use Sub-Tehsil Chakesar .....   | C-54 |
| Table C-44 | Land Use Sub-Tehsil Puran .....  | C-55 |
| Table C-45 | Land Use Sub-Tehsil Martung .....  | C-56 |
| Table C-46 | Cropped Area by Season and Crop (1987/88) .....                                      | C-57 |
| Table C-47 | Location and Scale of Marketing Facilities .....                                     | C-61 |
| Table C-48 | Location of Information System Center and<br>Terminal .....                          | C-61 |

### LIST OF FIGURES

|            |  |      |
|------------|--|------|
| Figure C-1 | Crop Calendar (Present) .....  | C-58 |
| Figure C-2 | Proposed Cropping Pattern .....  | C-59 |
| Figure C-3 | Cross Section Showing Main Feature of<br>Bench Terraces to be Improved ..... | C-60 |



## CHAPTER I PRESENT AGRICULTURE

### 1. Farm Size and Progress of Land Reform

The average farm size in both terms of farm area per farm and cultivated area per farm are respectively 1.5 hectare and 1.2 hectares in Swat District according to 1980 Pakistan Census of Agriculture. The comparison on farm size (cultivated area) at each level of Swat area are shown below;

Comparison of Farm Size (cultivated Area Basis)

| <u>Area</u>             | <u>Cultivated Area</u><br>( <sup>000</sup> ha) | <u>No. of Farm</u><br>( <sup>000</sup> ) | <u>Farm Size</u><br>( <sup>000</sup> ) |
|-------------------------|--|--|--|
| Pakistan <u>1/</u>      | 19,059   | 4,070                                    | 4.6                                    |
| NWFP <u>1/</u>          | 1,061  | 528                                      | 2.0                                    |
| Swat District <u>1/</u> | 137  | 110                                      | 1.2                                    |
| - Swat <u>2/</u>        | 99   | 76                                       | 1.3                                    |
| - Shangla Par <u>2/</u> | 31   | 42                                       | 1.3                                    |
| - Buner <u>2/</u>       | 51   | 32                                       | 1.6                                    |

Source: 1/ 1980 Census of Agriculture  
2/ Estimated by Study Team for 1988

About 41 percent of the total farm area are held by 11 percent of the total farm. This shows a considerable skewed distribution of land (See table C-1).

As of 1988 only, 540 hectares of land have been distributed to 586 of tenants under the land reform in Swat District (See Table C-2). The estimated farm size in term of cultivated area per farm in 1988 in the District is estimated at 1.4 hectares, where there are about 139,000 hectare of farm households exclusive of the livestock holders who hold no farm lands.

## 1.2 Land Use

The land use data by Sub-Tehsil in Swat District are collected from the Swat District Revenue Office. About 24 percent of the total area or 196 thousand hectares are cultivated, which comprise 49 thousand hectares of the irrigated area and 147 thousand of the unirrigated area (See Table C-4).

## 1.3 Crop Production

The average yields of the major crops in Swat District, maize, rice and wheat for latest five years are respectively 1.27 ton/ha, 1.58 ton/ha and 1.09 ton/ha according to the statistical data (See Table C-5).

The total production of maize and wheat in 1987/1988 have increased to more than 2.5 times of that in ten years ago (1978/79). On the other hands, the production of rice have been almost maintained during the period. The yields of these crops have not been raised significantly, although the cropped areas of maize and wheat in 1987/88 increased to about three times of these in 1978/79. This may cause the following problems;

- (i) Tremendous land have been converted into cultivated land from the uncultivated lands.
- (ii) The large-scaled development of mountainous lands threatens to increase the erosion hazard.

Comparing the yields of irrigated crops with those of unirrigated crops, the formers are as high as about 1.5 to 2.0 times of the latters for the most existing crops (See Table C-6 to C-22).

The overall cropping intensities in Swat and Buner Sub-Divisions are respectively 120 percent and 135 percent, while the intensity in Buner Sub-Division is 156 percent. The reason for the higher intensity in Buner Sub-Division would be the less area coverage of the low altitude lands to compare with that in the other two Sub-Divisions.

The cropping intensity in the irrigated areas is as high as 194 percent in the unirrigated areas of Swat Sub-Division. However, the cropping intensities in the Shangla Par and Buner are 136 percent and 155 percent respectively. It is considered that the low intensities are

derived from the shortage of water supply in the irrigation system (See Table C-23 to C-25).

#### 1.4 Supply of Crop Loan and Farm Inputs

In 1987/88, about 21,000 thousand Rupies of formal crop loan were rented by about 2,200 members of multipurpose cooperative societies' in Swat District. The repayment ratio of the rented loans were about 70 percent (See Table C-26).

The supplied amount of fertilizers and seeds through the cooperative societies are 654 tons and 2,251 tons respectively (See Table C-27).

On the other hand, about 178 tons of cereals and pulses' seeds, 18 thousands of fruit saplings are distributed through Agricultural Development Authority (ADA) in the District averagely for 1985/86 to 1986/87. Also about 8,800 tons of fertilizers in term of nutrient weight are distributed through ADA in the District (See Table C-30 and C-31).

#### 1.5 Farm Mechanization

The number of units for the total machinery in 1989 in Swat District are estimated as follows (See Table C-32);

|                 | <u>No. of Units</u> |
|-----------------|---------------------|
| Tubewell pump   | 36                  |
| Lift Pump       | 760                 |
| Tractors        | 1,553               |
| Wheat Threshers | 235                 |
| Rice Husker     | 204                 |
| Maize Shellers  | 216                 |
| Wheat Harvester | 1                   |
| Buldozer        | 19                  |

Most of machinery concentrate in Swat Sub-Division, while the number of these machinery units in Shangla Par and Buner Sub-Divisions are quite limited.

## 1.6 Animal Husbandry

### 1) Livestock Population

About 81 percent of total farm households including livestock holders raise about four heads of cattle (all ages) on the average, while about 50 percent of them do about three heads of buffaloes on the average. About 51 percent and 38 percent of total sheep and goats are raised by the migratory herds (See Table C-31).

### 2) Veterinary Facilities

There is no Veterinary Hospitals and Artificial Insemination Center in Shangla Par Sub-Division. Therefore, a large number of farmers are willing to have the services of Veterinary Hospitals. (See Table C-28)

### 3) Animal Nutrient Requirement

The annual nutrient requirement of TDN and DCP are respectively estimated at 553 tons and 49 tons for the converted cow units for all kinds of animals in Swat District.

### 4) Fish Production

The fish production, irrespective of the fish catch in rivers and the production in fishponds has been increased upto 45ton per year from 1970/71 to 1985/86 in Swat District (See Table C-34).

## CHAPTER II AGRICULTURAL DEVELOPMENT SUPPORTING PLAN

### 2.1 Proposed Cropping Pattern

There are two types of proposed irrigation systems namely, the reservoir type and the traditional irrigation improved systems type. The irrigation water in the reservoir type irrigation system will be able to supply water throughout year. Therefore, it is possible to apply the proposed cropping pattern A in Table C-35, where fruits and vegetables are included. However, the proposed cropping pattern B in Table C-35 will be applied in the improved traditional irrigation systems, because the systems will supply irrigation water only seasonally.

### 2.2 Target Yield of Crops

The target yields are studied for the following three cases of development (See Table c-35 to C-37);

- (i) The Barani lands are planned to be developed to raise crop productivity by land leveling and various kinds of soil conservation works like improvement of terraces. However the crop yields could be raised only slightly because the lands will remain as Barani lands even after the Project.
- (ii) The Barani lands will be developed to the irrigated land by the proposed irrigation schemes. Then, it will be possible to raise crop yields significantly.
- (iii) The traditional irrigation systems will be improved by improvement of the existing irrigation systems, where the crop could be improved by efficient water supply in the improved irrigation systems. The on-farm water management and drainage will be improved in the irrigation areas.

### 2.3 Proposed Agricultural Supporting Facilities

The quantity of staff, building space and equipments by agricultural supporting facilities are shown in Table C-39. The location of the proposed agricultural supporting facilities are formulated for the short, middle and long development terms by Sub-Division in Table C-40. The location of the facilities in the long term development plan for each Sub-Tehsil are as shown as in Table C-41. The target to establish each agricultural supporting facilities is shown in Table C-42.

### CHAPTER III PRESENT AGRICULTURE IN SIRDP AREA

The village-wise land use data in the three Sub-Tehsils in the SIRDP Area were collected from the respective Tehsil Offices. (See Table C-43 to C-45). About 14 percent of the total cultivated lands are irrigated in the Puran Sub-Tehsil, while only six to seven percent of the total cultivated lands are irrigated in the Chakesar and Martung Sub-Tehsil. The average number of farmers and cultivated area per village are as follows;

| Sub-Tehsil | No. of Village | No. of farmers |            |        | Farm Size (Cultivated) |
|------------|----------------|----------------|------------|--------|------------------------|
|            |                | Total          | Land Owner | Tenant |                        |
| Chakesar   | 18             | 10,309         | 6,199      | 4,110  | 0.66 ha                |
| Puran      | 21             | 12,010         | 8,562      | 3,448  | 0.70 ha                |
| Martung    | 28             | 8,621          | 6,494      | 2,127  | 0.52 ha                |

The average area of cultivated area per villages in Chakesar, Puran and Martung Sub-Tehsils are 380 hectares, 400 hectares and 161 hectares respectively. The cropped area by crop in the irrigated and unirrigated areas are shown in Table C-46.





## CHAPTER IV MARKETING PLAN

The two proposed major marketing plan are as follows;

### 1) Marketing Facilities Plan

|                          |                 |
|--------------------------|-----------------|
| Swat Sub-Division        | 6 plots         |
| Shangla Par Sub-Division | 4 plots         |
| Buner Sub-Division       | 2 plots         |
| <u>Total</u>             | <u>12 plots</u> |

### 2) Information System Plan for Agricultural Marketing

- i) Computer center to be established  
at ADBP Swat Regional Office ..... 1 center
- ii) Computer terminal ..... 2 sets

The proposed marketing facilities and information system are located in 12 large towns of the Study Area. The facilities are classified into large-, medium-, and small-scaled one,. The large scale is about 9,780m (2.4 acres including car park) in Mingora, capital city of Swat District; the medium scale is about 2,940m (0.7acres) in Sawari, Matta and others are the small-scale with about 1,470m (0.4acre) would be established.

Details of the marketing facilities are shown in the following Table C-47,48.

TABLE C-1 NUMBER OF FARMS BY SIZE IN SWAT DISTRICT

| Size of Farm             | Farms   |     | Farm Area  |     | Cultivated Area |     | Cultivated Area as % of Farm Area |                      | Average Farm Size |                      |
|--------------------------|---------|-----|------------|-----|-----------------|-----|-----------------------------------|----------------------|-------------------|----------------------|
|                          | Number  | (%) | Total (ha) | (%) | Total (ha)      | (%) | Farm Area (ha)                    | Cultivated Area (ha) | Farm Area (ha)    | Cultivated Area (ha) |
| 1. All Farms             | 110,068 |     | 164,653    |     | 136,731         | 83  |                                   |                      |                   |                      |
| 2. Private Farms (Total) | 110,068 | 100 | 164,653    | 100 | 136,731         | 100 |                                   |                      | 1.50              | 1.25                 |
| under 0.4 ha             | 17,558  | 16  | 3,461      | 2   | 3,390           | 2   |                                   |                      | 0.20              | 0.20                 |
| 0.4 to under 1.0         | 42,662  | 39  | 25,743     | 16  | 24,841          | 18  |                                   |                      | 0.61              | 0.57                 |
| 1.0 to under 2.0         | 26,966  | 24  | 36,376     | 22  | 33,299          | 24  |                                   |                      | 1.33              | 1.25                 |
| 2.0 to under 3.0         | 11,501  | 10  | 26,443     | 16  | 23,617          | 17  |                                   |                      | 2.31              | 2.06                 |
| 3.0 to under 5.1         | 7,396   | 7   | 27,776     | 17  | 23,658          | 17  |                                   |                      | 3.76              | 3.20                 |
| 5.1 to under 10.1        | 2,758   | 3   | 17,999     | 11  | 14,072          | 10  |                                   |                      | 6.52              | 5.10                 |
| 10.1 to under 20.2       | 805     | 1   | 10,245     | 6   | 6,980           | 5   |                                   |                      | 12.71             | 8.66                 |
| 20.2 to under 60.0       | 362     | -   | 11,043     | 7   | 4,730           | 3   |                                   |                      | 30.51             | 13.07                |
| 60.0 and above           | 60      | -   | 5,568      | 3   | 2,141           | 2   |                                   |                      | 92.80             | 35.69                |
| 3. Government Farm       | -       | -   | -          | -   | -               | -   |                                   |                      | -                 | -                    |

Source: Pakistan Census of Agriculture 1980

TABLE C-2 RESULT OF LAND REFORM IN SWAT DISTRICT  
(AS OF 1988)

| Sub-Tensil     | No. of Tenant | Total Area (ha) | Cultivated Area |                |                  | Uncultivated Area |                       |                   |                |
|----------------|---------------|-----------------|-----------------|----------------|------------------|-------------------|-----------------------|-------------------|----------------|
|                |               |                 | Subtotal (ha)   | Irrigated (ha) | Unirrigated (ha) | Sub total (ha)    | Cultivable waste (ha) | Grazing Land (ha) | Hill Land (ha) |
| 1. Matta       | 65            | 36.9            | 35.1            | 24.0           | 11.1             | 1.8               | -                     | -                 | 1.8            |
| 2. Khwazakhela | 23            | 41.5            | 41.3            | 3.2            | 38.1             | 0.2               | 0.2                   | -                 | 0.2            |
| 3. Charhagh    | 269           | 247.3           | 240.3           | 6.2            | 234.1            | 7.0               | 5.6                   | 1.4               | -              |
| 4. Babuzai     | 193           | 167.0           | 149.8           | 57.3           | 92.5             | 17.2              | 2.4                   | -                 | 14.8           |
| 5. Kabal       | 31            | 30.5            | 30.2            | 27.0           | 3.2              | 0.3               | 0.3                   | -                 | -              |
| 6. Barikot     | 5             | 16.8            | 16.0            | 9.6            | 6.4              | 0.8               | 0.6                   | -                 | 0.2            |
| Total          | 586           | 540.0           | 512.7           | 127.3          | 385.4            | 27.5              | 9.1                   | 1.4               | 17.0           |

Source: Land Reform office, Swat District

TABLE C-3 ESTIMATED NUMBER OF FARM HOUSEHOLD AND FARM SIZE (1988)

| Zone/Tehsil/Sub-Tehsil | No. of Household | No. of Agricultural Household |                |                  | Farm Size | Cultivated Area |            |              |
|------------------------|------------------|-------------------------------|----------------|------------------|-----------|-----------------|------------|--------------|
|                        |                  | Total                         | Farm Household | Livestock Holder |           | Total (ha)      | Irri. (ha) | Unirri. (ha) |
| Zone 1                 | 18,240           | 15,212                        | 11,783         | 3,429            | 0.73      | 8,656           | 5,959      | 2,697        |
| -Kalam                 | 7,845            | 6,543                         | 5,068          | 1,475            | 0.42      | 2,152           | 2,100      | 52           |
| -Bahrain               | 10,395           | 8,669                         | 6,715          | 1,954            | 0.97      | 6,504           | 3,859      | 2,645        |
| Zone 2                 | 52,955           | 44,165                        | 34,209         | 9,956            | 1.32      | 45,253          | 14,990     | 30,263       |
| -Matta/Shangwatai      | 31,040           | 25,888                        | 20,052         | 5,836            | 1.32      | 26,551          | 8,255      | 18,296       |
| -Khawazakhela/Charbagh | 21,915           | 18,277                        | 14,157         | 4,120            | 1.32      | 18,702          | 6,735      | 11,967       |
| Zone-3                 | 46,895           | 39,111                        | 30,295         | 8,816            |           | 45,055          | 18,271     | 26,784       |
| -Kabal                 | 18,630           | 15,537                        | 12,035         | 3,502            | 1.75      | 21,083          | 7,533      | 13,550       |
| -Mingora/Kanju         | 19,535           | 16,293                        | 12,620         | 3,673            | 0.92      | 11,660          | 4,983      | 6,677        |
| -Barikot               | 8,730            | 7,281                         | 5,640          | 1,641            | 2.18      | 12,312          | 5,755      | 6,557        |
| Zone 4                 |                  |                               |                |                  |           |                 |            |              |
| -Arpuri                | 19,790           | 16,505                        | 12,784         | 3,721            | 1.29      | 16,522          | 3,298      | 38,290       |
| Zone 5                 | 20,880           | 17,410                        | 13,484         | 3,926            | 1.47      | 19,778          | 2,145      | 17,633       |
| -Furan                 | 7,870            | 6,560                         | 5,080          | 1,480            | 1.65      | 8,399           | 1,337      | 7,062        |
| -Chakesar              | 8,440            | 7,039                         | 5,452          | 1,587            | 1.23      | 6,713           | 454        | 6,259        |
| -Martung               | 4,570            | 3,811                         | 2,952          | 859              | 1.53      | 4,515           | 354        | 4,161        |
| Zone 6                 |                  |                               |                |                  |           |                 |            |              |
| -Besham                | 7,680            | 6,405                         | 4,961          | 1,444            | 1.07      | 5,288           | 481        | 4,807        |
| Zone 7                 | 32,570           | 27,162                        | 21,039         | 6,123            | 1.70      | 35,929          | 3,693      | 32,235       |
| -Daggar                | 9,070            | 7,564                         | 5,859          | 1,705            | 1.73      | 10,151          | 1,691      | 8,461        |
| -Gadezai               | 9,400            | 7,839                         | 6,072          | 1,767            | 1.73      | 10,526          | 586        | 9,940        |
| -Chagharzai            | 6,920            | 5,771                         | 4,470          | 1,301            | 2.00      | 8,938           | 842        | 8,096        |
| -Gagra                 | 7,180            | 5,988                         | 4,638          | 1,350            | 1.36      | 6,313           | 574        | 5,739        |
| Zone 8                 |                  |                               |                |                  |           |                 |            |              |
| -Chamla/Amazai         | 9,880            | 8,239                         | 6,382          | 1,857            | 1.47      | 9,395           | 938        | 8,457        |
| Zone 9                 |                  |                               |                |                  |           |                 |            |              |
| -Khudukhel             | 7,740            | 6,455                         | 5,000          | 1,455            | 1.97      | 9,855           | 1,490      | 8,365        |
| Total                  | 216,630          | 180,664                       | 139,937        | 40,727           | 1.40      | 195,731         | 48,639     | 147,092      |

Source: Master Plan Study Team

TABLE C-4 LAND USE BY SUB-TEHSIL

| Sub-Tehsil                  | No. of Fields | Total area of reported land | IRRIGATED CULTIVATED LAND |              |         |       |       |                             |                  |           |                   |                      | Uncultivated and |         |                  |              |           | Total   | Hill of Net available for cultivation |               |              |
|-----------------------------|---------------|-----------------------------|---------------------------|--------------|---------|-------|-------|-----------------------------|------------------|-----------|-------------------|----------------------|------------------|---------|------------------|--------------|-----------|---------|---------------------------------------|---------------|--------------|
|                             |               |                             | Sub-total                 | Annual crops | Orchard | Rice  | only  | Tube well & Pump Irrigation | National Project | Sub-total | Two Crop-rotation | Single Crop-rotation | Hill-side        | Total   | Cultivable waste | Pasture Land | Grassland |         |                                       | Timber Forest | Shrub Forest |
| 1. Swat Sub-Div:            | 493,000       | 506,100                     | 98,980                    | 39,230       | 26,620  | 3,100 | 5,100 | 2,300                       | 2,110            | 59,750    | 20,040            | 39,320               | 390              | 407,120 | 5,280            | 20,220       | 100,540   | 140,230 | 1,460                                 | 122,920       | 16,370       |
| 1. Kalam                    | 54,171        | 206,720                     | 2,150                     | 2,100        | 2,100   | -     | -     | -                           | -                | 50        | 30                | 20                   | 204,080          | 50      | 380              | 46,350       | 32,600    | 480     | 122,570                               | 1,650         |              |
| 2. Bahrain                  | 54,092        | 85,650                      | 6,500                     | 5,860        | 3,770   | 70    | 10    | 10                          | -                | 2,640     | 890               | 1,720                | 20               | 73,190  | 410              | 2,450        | 20,740    | 32,730  | 30                                    | 122,570       | 1,640        |
| Sub-Total:                  | 108,263       | 291,880                     | 8,650                     | 5,960        | 5,810   | 70    | 10    | 10                          | -                | 2,690     | 920               | 1,750                | 20               | 283,130 | 460              | 2,830        | 67,090    | 66,230  | 510                                   | 122,920       | 3,690        |
| 3. Matta                    | 111,674       | 65,120                      | 26,560                    | 8,260        | 5,410   | 1,480 | 1,260 | 10                          | -                | 18,300    | 9,050             | 9,110                | 140              | 38,590  | 580              | 4,240        | 8,050     | 21,850  | 890                                   | -             | 2,980        |
| 4. Charsbagh                | 17,372        | 42,420                      | 18,700                    | 6,730        | 4,840   | 360   | 890   | -                           | 640              | 11,970    | 2,480             | 7,430                | 60               | 23,740  | 1,190            | 5,050        | 3,980     | 10,790  | 60                                    | -             | 2,670        |
| Sub-Total:                  | 189,046       | 107,590                     | 45,260                    | 14,990       | 10,250  | 1,840 | 2,250 | 10                          | 640              | 30,270    | 13,530            | 16,540               | 200              | 62,330  | 1,770            | 9,290        | 12,030    | 32,640  | 950                                   | -             | 5,650        |
| 5. Kabal                    | 98,045        | 40,510                      | 21,080                    | 7,570        | 5,690   | 290   | 750   | 450                         | 350              | 13,550    | 3,480             | 10,070               | -                | 19,420  | 1,230            | 2,690        | 7,330     | 5,170   | -                                     | -             | 3,050        |
| 6. Mingora/Kenju            | 20,027        | 31,770                      | 11,670                    | 4,280        | 3,050   | 290   | 270   | 260                         | 1,120            | 6,580     | 2,100             | 4,240                | 140              | 9,700   | 840              | 3,480        | 4,200     | 7,020   | -                                     | -             | 3,230        |
| 7. Barakot                  | 47,559        | 34,730                      | 12,520                    | 5,760        | 1,780   | 610   | 1,820 | 1,570                       | -                | 6,560     | 10                | 6,520                | 30               | 22,420  | 980              | 1,770        | 3,890     | 7,140   | -                                     | -             | 5,230        |
| Sub-Total:                  | 195,691       | 106,630                     | 45,070                    | 18,280       | 10,500  | 1,190 | 2,840 | 2,280                       | 1,470            | 26,790    | 5,590             | 21,030               | 170              | 61,580  | 3,030            | 8,100        | 21,420    | 21,560  | -                                     | -             | 7,650        |
| 2. Shangla Par Sub-Division | 209,687       | 137,580                     | 41,580                    | 3,300        | 2,990   | -     | -     | 310                         | -                | 38,280    | 23,640            | 14,330               | 310              | 96,000  | 4,190            | 31,360       | 14,530    | 29,800  | -                                     | -             | 6,160        |
| 1. Alpur                    | 75,236        | 57,370                      | 16,510                    | 670          | 610     | -     | -     | 60                          | -                | 15,840    | 8,890             | 6,920                | 30               | 40,840  | 640              | 8,280        | 5,470     | 24,530  | -                                     | -             | 1,920        |
| 2. Puren                    | 42,618        | 24,990                      | 8,400                     | 1,340        | 1,210   | -     | -     | 130                         | -                | 7,060     | 4,910             | 3,150                | -                | 16,590  | 1,040            | 5,020        | 4,130     | 5,360   | -                                     | -             | 1,040        |
| 3. Chakewar                 | 37,147        | 23,640                      | 6,860                     | 450          | 410     | -     | -     | 40                          | -                | 6,410     | 4,220             | 2,040                | 150              | 16,780  | 1,290            | 5,270        | 2,980     | 6,170   | -                                     | -             | 1,070        |
| 4. Martung                  | 53,634        | 15,920                      | 4,510                     | 350          | 320     | -     | -     | 30                          | -                | 4,160     | 2,970             | 1,190                | -                | 11,410  | 480              | 7,660        | 840       | 1,260   | -                                     | -             | 1,170        |
| Sub-Total:                  | 113,399       | 64,530                      | 19,770                    | 2,140        | 1,940   | -     | -     | 200                         | -                | 17,630    | 12,100            | 5,380                | 150              | 44,780  | 2,810            | 17,930       | 7,950     | 12,790  | -                                     | -             | 3,280        |
| 5. Pisham                   | 21,052        | 15,680                      | 5,300                     | 490          | 440     | -     | -     | 50                          | -                | 4,810     | 2,650             | 2,030                | 130              | 10,380  | 700              | 5,130        | 1,110     | 2,480   | -                                     | -             | 960          |
| 3. Buner Sub-Div:           | 265,403       | 172,420                     | 55,200                    | 6,130        | 2,730   | 980   | 680   | 370                         | 1,370            | 49,070    | 20,140            | 28,010               | 920              | 117,220 | 5,810            | 18,150       | 52,680    | 31,790  | -                                     | -             | 8,790        |
| 1. Daggar                   | 43,758        | 29,030                      | 10,150                    | 1,690        | 540     | 50    | 10    | 10                          | 1,080            | 8,460     | 3,220             | 4,910                | 330              | 18,880  | 910              | 2,720        | 9,020     | 4,600   | -                                     | -             | 1,630        |
| 2. Cadezai                  | 51,115        | 36,390                      | 10,530                    | 390          | 520     | 20    | 10    | -                           | 40               | 3,940     | 3,900             | 3,810                | 430              | 25,860  | 1,030            | 1,460        | 11,500    | 10,370  | -                                     | -             | 1,510        |
| 3. Charsbaghal              | 37,675        | 22,800                      | 8,540                     | 840          | 340     | 340   | -     | 160                         | -                | 3,100     | 3,470             | 4,820                | 10               | 13,860  | 680              | 1,420        | 7,620     | 2,880   | -                                     | -             | 1,170        |
| 4. Cagra                    | 36,952        | 25,920                      | 6,320                     | 380          | 420     | -     | -     | 170                         | 1,280            | 32,240    | 14,630            | 16,830               | 780              | 76,200  | 3,290            | 13,050       | 33,640    | 22,610  | -                                     | -             | 1,290        |
| Sub-Total:                  | 169,500       | 114,140                     | 35,940                    | 3,700        | 1,820   | 410   | 20    | 200                         | 90               | 8,460     | 4,220             | 4,100                | 140              | 79,190  | 910              | 3,010        | 5,740     | 7,960   | -                                     | -             | 1,570        |
| 5. Chamlia/Amazai           | 55,829        | 28,600                      | 9,410                     | 950          | 650     | 170   | 40    | 200                         | -                | 8,270     | 1,290             | 7,080                | -                | 19,830  | 1,610            | 2,080        | 13,300    | 1,220   | -                                     | -             | 1,620        |
| 6. Khudkhal                 | 38,074        | 29,680                      | 9,850                     | 1,420        | 260     | 400   | 620   | 2,980                       | 3,430            | 147,100   | 63,820            | 81,660               | 1,620            | 620,340 | 15,240           | 69,730       | 167,750   | 211,920 | 1,460                                 | -             | 122,920      |
| Total:                      | 966,090       | 816,100                     | 195,760                   | 48,660       | 32,340  | 4,080 | 5,780 | 2,980                       | 3,430            | 147,100   | 63,820            | 81,660               | 1,620            | 620,340 | 15,240           | 69,730       | 167,750   | 211,920 | 1,460                                 | -             | 122,920      |

Source: Revenue Office, Swat District

TABLE C-5 SUMMARY OF CROP PRODUCTION DATA  
(1983/84 to 1988/88)

| Crop               | Pakistan                      |                   |                                     | N.W.F.P.                      |                   |                                     | Swat District                 |                   |                                     |
|--------------------|-------------------------------|-------------------|-------------------------------------|-------------------------------|-------------------|-------------------------------------|-------------------------------|-------------------|-------------------------------------|
|                    | Area<br>( <sup>'000</sup> ha) | Yield<br>(ton/ha) | Productor<br>( <sup>'000</sup> ton) | Area<br>( <sup>'000</sup> ha) | Yield<br>(ton/ha) | Productor<br>( <sup>'000</sup> ton) | Area<br>( <sup>'000</sup> ha) | Yield<br>(ton/ha) | Productor<br>( <sup>'000</sup> ton) |
| 1. Maize           | 816.1<br>(100.0)              | 1.30<br>(100.0)   | 1,057.5<br>(100.0)                  | 452.5<br>(55.4)               | 1.34<br>(103.1)   | 607.7<br>(57.5)                     | 106.2<br>(13.0)               | 1.27<br>(97.7)    | 135.4<br>(12.8)                     |
| 2. Rice            | 1,977.8<br>(100.0)            | 1.64<br>(100.0)   | 3,260.1<br>(100.0)                  | 69.2<br>(3.4)                 | 1.65<br>(100.6)   | 1,141<br>(3.5)                      | 18.4<br>(0.9)                 | 1.58<br>(96.3)    | 29.1<br>(0.9)                       |
| 3. Black Gram      | 96.2<br>(100.0)               | 0.46<br>(100.0)   | 45.1<br>(100.0)                     | 10.7<br>(11.1)                | 0.63<br>(137.0)   | 6.8<br>(15.1)                       | 2.6<br>(2.7)                  | 0.76<br>(165.2)   | 2.0<br>(4.4)                        |
| 4. Potato          | 55.6<br>(100.0)               | 10.0<br>(100.0)   | 557.2<br>(100.0)                    | 10.4<br>(18.7)                | 10.1<br>(101.0)   | 105.1<br>(18.9)                     | 2.9<br>(5.2)                  | 10.6<br>(106.0)   | 30.8<br>(5.5)                       |
| 5. Sugarcane       | 839.8<br>(100.0)              | 37.1<br>(100.0)   | 31,196.2<br>(100.0)                 | 96.5<br>(11.5)                | 39.1<br>(105.4)   | 3,776.0<br>(12.1)                   | 2.1<br>(0.3)                  | 34.7<br>(93.5)    | 73.7<br>(0.2)                       |
| 6. Apple           | 15.2<br>(100.0)               | 9.6<br>(100.0)    | 145.6<br>(100.0)                    | 5.7<br>(37.5)                 | 13.2<br>(137.5)   | 75.3<br>(51.7)                      | 2.1<br>(13.8)                 | 12.7<br>(132.3)   | 26.7<br>(18.3)                      |
| 7. Apricot         | 4.6<br>(100.0)                | 11.6<br>(100.0)   | 53.4<br>(100.0)                     | 1.2<br>(26.1)                 | 10.0<br>(86.2)    | 12.0<br>(22.5)                      | 0.4<br>(8.7)                  | 10.4<br>(89.7)    | 4.1<br>(7.7)                        |
| 8. Plum            | 4.0<br>(100.0)                | 10.9<br>(100.0)   | 43.6<br>(100.0)                     | 2.8<br>(70.0)                 | 10.8<br>(99.1)    | 30.1<br>(69.0)                      | 0.3<br>(7.5)                  | 9.7<br>(88.9)     | 2.9<br>(6.7)                        |
| 9. Pears           | 2.9<br>(100.0)                | 11.7<br>(100.0)   | 33.8<br>(100.0)                     | 2.5<br>(86.2)                 | 12.3<br>(105.1)   | 30.7<br>(90.8)                      | 0.4<br>(13.8)                 | 16.3<br>(139.3)   | 6.5<br>(19.2)                       |
| 8. Wheat           | 7,392.2<br>(100.0)            | 1.68<br>(100.0)   | 12,418.0<br>(100.0)                 | 784.1<br>(10.6)               | 1.14<br>(67.9)    | 899.4<br>(7.2)                      | 92.9<br>(1.3)                 | 1.09<br>(60.0)    | 94.3<br>(0.8)                       |
| 9. Barley          | 180.7<br>(100.0)              | 0.72<br>(100.0)   | 129.6<br>(100.0)                    | 78.6<br>(43.5)                | 0.76<br>(105.6)   | 60.1<br>(46.4)                      | 3.3<br>(1.8)                  | 1.03<br>(143.1)   | 3.4<br>(2.6)                        |
| 10. Rape & Mustard | 321.8<br>(100.0)              | 0.70<br>(100.0)   | 225.5<br>(100.0)                    | 40.8<br>(12.7)                | 0.43<br>(61.4)    | 17.3<br>(7.7)                       | 3.5<br>(1.1)                  | 0.37<br>(52.9)    | 1.3<br>(57.6)                       |
| 11. Onion          | 48.3<br>(100.0)               | 10.6<br>(100.0)   | 514.2<br>(100.0)                    | 3.4<br>(7.0)                  | 13.2<br>(124.5)   | 44.8<br>(8.7)                       | 1.5<br>(3.1)                  | 15.9<br>(150.0)   | 23.6<br>(4.6)                       |
| 12. Citrus         | 115.8<br>(100.0)              | 9.7<br>(100.0)    | 1,393.2<br>(100.0)                  | 3.4<br>(2.9)                  | 8.5<br>(87.6)     | 28.9<br>(2.1)                       | 0.3<br>(0.3)                  | 3.5<br>(36.1)     | 2.8<br>(0.2)                        |

TABLE C-6 CROP PRODUCTION, MAIZE

| Year           | Pakistan               |                               | N.W.F.P.               |                               | Malakand Division      |                               | Swat District          |                               |       |      |       |
|----------------|------------------------|-------------------------------|------------------------|-------------------------------|------------------------|-------------------------------|------------------------|-------------------------------|-------|------|-------|
|                | Cropped Area ('000 ha) | Yield Production (ton) ('000) | Cropped Area ('000 ha) | Yield Production (ton) ('000) | Cropped Area ('000 ha) | Yield Production (ton) ('000) | Cropped Area ('000 ha) | Yield Production (ton) ('000) |       |      |       |
| 1. 1978/79     | 650.2                  | 1.23                          | 798.6                  | 1.23                          | 321.5                  | 1.24                          | 398.9                  | 1.29                          | 83.1  | 1.10 | 43.1  |
| 2. 1979/80     | 701.1                  | 1.25                          | 875.2                  | 1.26                          | 347.8                  | 1.26                          | 438.4                  | 1.35                          | 88.5  | 1.29 | 50.7  |
| 3. 1980/81     | 769.0                  | 1.26                          | 970.4                  | 1.29                          | 396.3                  | 1.29                          | 510.9                  | 1.38                          | 119.2 | 1.33 | 79.0  |
| 4. 1981/82     | 739.1                  | 1.26                          | 930.4                  | 1.31                          | 391.8                  | 1.31                          | 512.2                  | 1.39                          | 118.5 | 1.34 | 78.0  |
| 5. 1982/83     | 789.8                  | 1.27                          | 1,005.4                | 1.26                          | 431.4                  | 1.26                          | 547.9                  | 1.32                          | 160.1 | 1.26 | 119.5 |
| 6. 1983/84     | 798.0                  | 1.27                          | 1,013.5                | 1.25                          | 439.5                  | 1.25                          | 550.9                  | 1.32                          | 161.5 | 1.27 | 120.2 |
| 7. 1984/85     | 808.8                  | 1.27                          | 1,027.6                | 1.25                          | 442.9                  | 1.25                          | 554.0                  | 1.32                          | 165.7 | 1.25 | 123.7 |
| 8. 1985/86     | 803.9                  | 1.26                          | 1,009.4                | 1.32                          | 440.9                  | 1.32                          | 580.6                  | 1.34                          | 168.2 | 1.29 | 126.1 |
| 9. 1986/87     | 816.0                  | 1.36                          | 1,111.0                | 1.45                          | 444.7                  | 1.45                          | 643.5                  | 1.52                          | 190.6 | 1.43 | 140.9 |
| 10. 1987/88(E) | 854.0                  | 1.32                          | 1,126.0                | 1.43                          | 494.6                  | 1.43                          | 709.3                  | 1.28                          | 215.8 | 1.18 | 166.2 |
| Mean           | 773.0                  | 1.28                          | 986.8                  | 1.31                          | 415.1                  | 1.31                          | 544.7                  | 1.35                          | 147.1 | 1.27 | 104.7 |
| Last 5 years   | 816.1                  | 1.30                          | 1,057.5                | 1.34                          | 452.5                  | 1.34                          | 607.7                  | 1.35                          | 180.4 | 1.27 | 135.4 |

Source: Agricultural Statistics of Pakistan: MFC

TABLE C-7 CROP PRODUCTION, RICE

| Year         | Pakistan                  |                           |          | N.W.F.P.                  |                           |          | Malakand Division         |                           |          | Swat District             |                           |          |                           |                           |          |
|--------------|---------------------------|---------------------------|----------|---------------------------|---------------------------|----------|---------------------------|---------------------------|----------|---------------------------|---------------------------|----------|---------------------------|---------------------------|----------|
|              | Cropped Area<br>'000 (ha) | Yield Production<br>(ton) | (ton/ha) | Cropped Area<br>'000 (ha) | Yield Production<br>(ton) | (ton/ha) | Cropped Area<br>'000 (ha) | Yield Production<br>(ton) | (ton/ha) | Cropped Area<br>'000 (ha) | Yield Production<br>(ton) | (ton/ha) | Cropped Area<br>'000 (ha) | Yield Production<br>(ton) | (ton/ha) |
| 1. 1978/79   | 1,025.6                   | 3,272.0                   | 1.62     | 67.9                      | 61.2                      | 1.53     | 44.6                      | 70.2                      | 1.57     | 19.8                      | 70.2                      | 1.45     | 19.8                      | 28.7                      | 1.45     |
| 2. 1979/80   | 2,034.5                   | 3,215.8                   | 1.58     | 67.2                      | 98.6                      | 1.56     | 44.8                      | 70.5                      | 1.57     | 19.8                      | 70.5                      | 1.45     | 19.8                      | 28.8                      | 1.45     |
| 3. 1980/81   | 1,933.1                   | 3,123.2                   | 1.62     | 66.2                      | 106.5                     | 1.43     | 45.0                      | 72.8                      | 1.62     | 20.1                      | 72.8                      | 1.53     | 20.1                      | 30.9                      | 1.53     |
| 4. 1981/82   | 1,976.0                   | 3,429.7                   | 1.74     | 69.3                      | 110.7                     | 1.59     | 46.1                      | 74.9                      | 1.62     | 20.3                      | 74.9                      | 1.55     | 20.3                      | 31.4                      | 1.55     |
| 5. 1982/83   | 1,978.1                   | 3,444.7                   | 1.74     | 70.5                      | 112.7                     | 1.60     | 46.8                      | 76.0                      | 1.62     | 20.4                      | 76.0                      | 1.54     | 20.4                      | 31.5                      | 1.54     |
| 6. 1983/84   | 1,998.5                   | 3,339.5                   | 1.67     | 72.2                      | 115.8                     | 1.60     | 46.8                      | 76.6                      | 1.63     | 20.5                      | 76.6                      | 1.55     | 20.5                      | 31.8                      | 1.55     |
| 7. 1984/85   | 1,998.5                   | 3,315.2                   | 1.66     | 72.4                      | 115.5                     | 1.60     | 47.0                      | 77.1                      | 1.64     | 20.6                      | 77.1                      | 1.55     | 20.6                      | 32.0                      | 1.55     |
| 8. 1985/86   | 1,863.2                   | 2,918.9                   | 1.57     | 70.1                      | 113.8                     | 1.60     | 46.1                      | 76.9                      | 1.67     | 20.6                      | 76.9                      | 1.57     | 20.6                      | 32.3                      | 1.57     |
| 9. 1986/87   | 2,066.0                   | 3,486.0                   | 1.69     | 70.5                      | 118.1                     | 1.67     | 46.2                      | 77.7                      | 1.68     | 20.6                      | 77.7                      | 1.58     | 20.6                      | 32.7                      | 1.58     |
| 10. 1987/88  | 1,963.0                   | 3,241.0                   | 1.65     | 60.9                      | 107.5                     | 1.76     | 6.9                       | 12.6                      | 1.81     | 9.7                       | 12.6                      | 1.73     | 9.7                       | 16.7                      | 1.73     |
| Mean         | 1,983.7                   | 3,278.6                   | 1.65     | 68.7                      | 106.0                     | 1.54     | 42.0                      | 68.5                      | 1.63     | 20.5                      | 68.5                      | 1.48     | 20.5                      | 30.4                      | 1.48     |
| Last 5 years | 1,977.8                   | 3,260.1                   | 1.64     | 69.2                      | 114.1                     | 1.65     | 38.6                      | 64.2                      | 1.66     | 18.4                      | 64.2                      | 1.58     | 18.4                      | 29.1                      | 1.58     |

Source: Agricultural Statistics of Pakistan: MFC



TABLE C-8 CROP PRODUCTION, MONG (BLACK GRAM)

| Year         | Pakistan               |                |                       | N.W.F.                 |                |                       | Malakand Division      |                |                       | Swat District          |                |                       |
|--------------|------------------------|----------------|-----------------------|------------------------|----------------|-----------------------|------------------------|----------------|-----------------------|------------------------|----------------|-----------------------|
|              | Cropped Area '000 (ha) | Yield (ton/ha) | Production '000 (ton) | Cropped Area '000 (ha) | Yield (ton/ha) | Production '000 (ton) | Cropped Area '000 (ha) | Yield (ton/ha) | Production '000 (ton) | Cropped Area '000 (ha) | Yield (ton/ha) | Production '000 (ton) |
| 1. 1978/79   | 65.9                   | 0.45           | 30.0                  | 9.9                    | 0.55           | 5.5                   | 2.5                    | 0.68           | 1.7                   | 0.8                    | 0.63           | 0.5                   |
| 2. 1979/80   | 69.0                   | 0.47           | 32.7                  | 8.7                    | 0.57           | 4.9                   | 2.5                    | 0.68           | 1.7                   | 0.8                    | 0.50           | 0.4                   |
| 3. 1980/81   | 67.0                   | 0.48           | 31.0                  | 7.7                    | 0.58           | 4.4                   | 2.2                    | 0.73           | 1.6                   | 0.4                    | 0.50           | 0.2                   |
| 4. 1981/82   | 65.6                   | 0.48           | 31.8                  | 8.6                    | 0.61           | 5.2                   | 2.3                    | 0.82           | 1.9                   | 0.7                    | 0.85           | 0.6                   |
| 5. 1982/83   | 79.0                   | 0.50           | 31.6                  | 9.5                    | 0.66           | 6.3                   | 4.4                    | 0.81           | 3.6                   | 2.8                    | 0.82           | 2.3                   |
| 6. 1983/84   | 91.0                   | 0.46           | 41.8                  | 10.4                   | 0.66           | 6.9                   | 4.4                    | 0.84           | 3.7                   | 3.0                    | 0.83           | 2.5                   |
| 7. 1984/85   | 93.6                   | 0.48           | 44.6                  | 11.0                   | 0.65           | 7.2                   | 4.4                    | 0.84           | 3.7                   | 3.0                    | 0.83           | 2.5                   |
| 8. 1985/86   | 104.1                  | 0.47           | 48.8                  | 10.8                   | 0.66           | 7.1                   | 4.4                    | 0.84           | 3.7                   | 3.0                    | 0.83           | 2.5                   |
| 9. 1986/87   | N.A                    | N.A            | N.A                   | 13.8                   | 0.65           | 9.0                   | 4.5                    | 0.84           | 3.8                   | 3.0                    | 0.83           | 2.5                   |
| 10. 1987/88  | N.A                    | N.A            | N.A                   | 7.3                    | 0.50           | 3.7                   | 2.8                    | 0.50           | 1.4                   | 1.2                    | 0.09           | 0.1                   |
| Mean         | 79.4                   | 0.45           | 36.5                  | 9.8                    | 0.61           | 6.0                   | 3.4                    | 0.82           | 2.8                   | 1.9                    | 0.77           | 1.5                   |
| Last 5 Years | 96.2                   | 0.46           | 45.1                  | 10.7                   | 0.63           | 6.8                   | 4.1                    | 0.80           | 3.3                   | 2.6                    | 0.76           | 2.0                   |

Source: Agricultural Statistics of Pakistan, MFC

Note : Whole area are under rainfed conditions

TABLE C-9 CROP PRODUCTION, POTATO

| Year         | Pakistan     |                  |              | N.W.F.P.         |              |                  | Malakand Division |                  |              | Swat District    |              |                  |
|--------------|--------------|------------------|--------------|------------------|--------------|------------------|-------------------|------------------|--------------|------------------|--------------|------------------|
|              | Cropped Area | Yield Production | Cropped Area | Yield Production | Cropped Area | Yield Production | Cropped Area      | Yield Production | Cropped Area | Yield Production | Cropped Area | Yield Production |
|              | '000 (ha)    | (ton)            | '000 (ha)    | (ton)            | '000 (ha)    | (ton)            | '000 (ha)         | (ton)            | '000 (ha)    | (ton)            | '000 (ha)    | (ton)            |
| 1. 1978/79   | 37.7         | 10.4             | 392.4        | 8.2              | 9.3          | 76.2             | 3.4               | 8.6              | 29.3         | 2.1              | 9.4          | 19.8             |
| 2. 1979/80   | 42.9         | 10.4             | 448.5        | 8.4              | 9.4          | 78.8             | 3.5               | 8.5              | 29.7         | 2.1              | 9.4          | 19.8             |
| 3. 1980/81   | 38.0         | 10.4             | 394.3        | 7.6              | 9.3          | 75.8             | 3.7               | 9.0              | 33.3         | 2.3              | 9.7          | 22.3             |
| 4. 1981/82   | 45.3         | 10.5             | 476.6        | 8.1              | 9.3          | 95.8             | 4.1               | 9.5              | 39.0         | 2.5              | 10.2         | 25.4             |
| 5. 1982/83   | 51.5         | 10.1             | 518.1        | 10.3             | 9.7          | 92.9             | 4.6               | 9.2              | 42.3         | 3.0              | 9.5          | 28.6             |
| 6. 1983/84   | 49.5         | 10.3             | 509.8        | 10.2             | 9.7          | 99.5             | 4.7               | 9.2              | 43.4         | 3.0              | 9.6          | 28.7             |
| 7. 1984/85   | 54.5         | 10.0             | 543.4        | 10.5             | 9.7          | 102.1            | 4.8               | 9.3              | 44.5         | 3.0              | 9.6          | 28.8             |
| 8. 1985/86   | 62.9         | 9.8              | 618.3        | 10.6             | 9.8          | 104.3            | 4.9               | 9.1              | 44.8         | 3.0              | 9.6          | 28.9             |
| 9. 1986/87   | N.A.         | N.A.             | N.A.         | 11.7             | 10.6         | 124.5            | 4.9               | 11.2             | 55.0         | 3.0              | 12.4         | 37.4             |
| 10. 1987/88  | N.A.         | N.A.             | N.A.         | 8.8              | 10.8         | 95.2             | 4.3               | 11.0             | 47.3         | 2.4              | 12.3         | 30.3             |
| Mean         | 47.8         | 10.2             | 487.7        | 9.4              | 10.1         | 94.5             | 4.3               | 9.5              | 40.9         | 2.3              | 11.7         | 27.6             |
| Last 5 years | 55.6         | 10.0             | 557.2        | 10.4             | 10.1         | 105.1            | 4.7               | 10.0             | 47.0         | 2.9              | 10.6         | 30.8             |

Source: Agricultural Statistics of Pakistan: MFC

Note: About 86% of the total cropped area are under irrigation, and about 98% of those are Kharif cropped area.

TABLE C-10 CROP PRODUCTION, SUGARCANE

| Year         | Pakistan     |                  |              | N.W.F.P.         |              |                  | Malakand Division |                  |              | Swat District    |              |                  |
|--------------|--------------|------------------|--------------|------------------|--------------|------------------|-------------------|------------------|--------------|------------------|--------------|------------------|
|              | Cropped Area | Yield Production | Cropped Area | Yield Production | Cropped Area | Yield Production | Cropped Area      | Yield Production | Cropped Area | Yield Production | Cropped Area | Yield Production |
|              | '000 (ha)    | (ton/ha)         | '000 (ha)    | (ton/ha)         | '000 (ha)    | (ton/ha)         | '000 (ha)         | (ton/ha)         | '000 (ha)    | (ton/ha)         | '000 (ha)    | (ton/ha)         |
| 1. 1978/79   | 752.5        | 36.3             | 27,325.5     | 38.0             | 3,606.1      | 5.4              | 36.6              | 197.9            | 0.9          | 38.6             | 34.7         | 34.7             |
| 2. 1979/80   | 718.5        | 38.3             | 27,497.7     | 39.2             | 3,417.0      | 5.4              | 36.8              | 198.8            | 1.0          | 36.3             | 36.3         | 36.3             |
| 3. 1980/81   | 824.7        | 39.2             | 32,359.4     | 39.8             | 3,598.0      | 6.0              | 36.9              | 221.3            | 1.1          | 37.9             | 41.7         | 41.7             |
| 4. 1981/82   | 946.7        | 38.6             | 36,579.7     | 40.1             | 4,057.2      | 6.6              | 37.0              | 243.9            | 1.7          | 38.3             | 65.1         | 65.1             |
| 5. 1982/83   | 911.7        | 35.7             | 32,533.5     | 40.1             | 4,017.6      | 6.8              | 36.6              | 249.1            | 1.9          | 36.7             | 69.8         | 69.8             |
| 6. 1983/84   | 896.5        | 38.2             | 34,287.3     | 38.8             | 4,065.3      | 7.3              | 36.3              | 264.9            | 2.3          | 36.2             | 83.2         | 83.2             |
| 7. 1984/85   | 903.6        | 35.6             | 32,139.6     | 38.8             | 3,722.4      | 7.3              | 36.2              | 264.4            | 2.4          | 34.5             | 82.7         | 82.7             |
| 8. 1985/86   | 779.8        | 35.7             | 27,856.3     | 38.9             | 3,553.1      | 7.3              | 35.7              | 261.0            | 2.4          | 33.1             | 79.4         | 79.4             |
| 9. 1986/87   | 762.0        | 39.3             | 29,966.0     | 38.4             | 3,518.5      | 7.3              | 37.1              | 271.7            | 2.3          | 37.3             | 85.8         | 85.8             |
| 10. 1987/88  | 857.0        | 37.0             | 31,707.0     | 40.7             | 4,020.5      | 4.9              | 36.6              | 179.4            | 1.1          | 31.0             | 34.1         | 34.1             |
| Mean         | 835.3        | 37.4             | 31,225.2     | 39.3             | 3,757.6      | 6.4              | 36.8              | 235.2            | 1.7          | 36.1             | 61.3         | 61.3             |
| Last 5 years | 839.8        | 37.1             | 31,191.2     | 39.1             | 3,776.0      | 6.8              | 36.5              | 248.3            | 2.1          | 34.7             | 73.7         | 73.7             |

Source: Agricultural Statistics of Pakistan: MFC

TABLE C-11 CROP PRODUCTION, APPLE

| Year         | Pakistan     |                  |              | N.W.F.P.         |              |                  | Malakand Division |                  |              | Swat District    |              |                  |
|--------------|--------------|------------------|--------------|------------------|--------------|------------------|-------------------|------------------|--------------|------------------|--------------|------------------|
|              | Cropped Area | Yield Production | Cropped Area | Yield Production | Cropped Area | Yield Production | Cropped Area      | Yield Production | Cropped Area | Yield Production | Cropped Area | Yield Production |
|              | '000 (ha)    | (ton) '000       | (ha) '000    | (ton) '000       | (ha) '000    | (ton) '000       | (ha) '000         | (ton) '000       | (ha) '000    | (ton) '000       | (ha) '000    | (ton) '000       |
| 1. 1978/79   | 10.3         | 93.7             | 3.8          | 11.5             | 43.7         | 2.2              | 12.5              | 27.5             | 2.1          | 9.7              | 20.3         | 20.3             |
| 2. 1979/80   | 10.8         | 99.2             | 3.9          | 11.7             | 45.6         | 2.3              | 12.2              | 28.0             | 2.1          | 12.7             | 26.7         | 26.7             |
| 3. 1980/81   | 11.4         | 107.4            | 4.1          | 11.8             | 48.2         | 2.4              | 12.4              | 29.8             | 2.3          | 12.3             | 28.4         | 28.4             |
| 4. 1981/82   | 11.9         | 114.1            | 4.4          | 11.7             | 51.6         | 2.6              | 12.2              | 31.8             | 2.4          | 12.6             | 30.3         | 30.3             |
| 5. 1982/83   | 12.9         | 128.6            | 4.6          | 12.0             | 55.1         | 2.7              | 12.4              | 33.4             | 2.5          | 12.8             | 31.9         | 31.9             |
| 6. 1983/84   | 13.3         | 128.1            | 4.2          | 12.1             | 50.8         | 2.2              | 12.9              | 28.3             | 2.0          | 13.3             | 26.5         | 26.5             |
| 7. 1984/85   | 14.8         | 142.7            | 5.0          | 11.8             | 59.0         | 2.3              | 12.6              | 28.9             | 2.0          | 13.3             | 26.7         | 26.7             |
| 8. 1985/86   | 17.4         | 166.0            | 6.4          | 11.4             | 72.9         | 2.3              | 13.0              | 30.0             | 2.0          | 13.3             | 26.7         | 26.7             |
| 9. 1986/87   | N.A.         | 196.0            | 6.5          | 14.7             | 95.7         | 2.3              | 13.2              | 30.3             | 2.1          | 12.8             | 26.8         | 26.8             |
| 10. 1987/88  | N.A.         | N.A.             | 6.6          | 14.9             | 98.3         | 2.3              | 13.2              | 30.4             | 2.4          | 11.4             | 26.7         | 26.7             |
| Mean         | 12.9         | 130.6            | 5.0          | 12.4             | 62.1         | 2.3              | 12.9              | 29.8             | 2.2          | 12.3             | 27.1         | 27.1             |
| Last 5 years | 15.2         | 145.6            | 5.7          | 13.2             | 75.3         | 2.3              | 12.9              | 29.6             | 2.1          | 12.7             | 26.7         | 26.7             |

Source: Agricultural Statistics of Pakistan: MFC

TABLE C-12 CROP PRODUCTION, APRICOT

| Year         | Pakistan     |                  |              | N.W.F.P.         |              |                  | Malakand Division |                  |              | Swat District    |              |                  |
|--------------|--------------|------------------|--------------|------------------|--------------|------------------|-------------------|------------------|--------------|------------------|--------------|------------------|
|              | Cropped Area | Yield Production | Cropped Area | Yield Production | Cropped Area | Yield Production | Cropped Area      | Yield Production | Cropped Area | Yield Production | Cropped Area | Yield Production |
|              | '000 (ha)    | (ton)            | '000 (ha)    | (ton/ha)         | '000 (ha)    | (ton/ha)         | '000 (ha)         | (ton/ha)         | '000 (ha)    | (ton/ha)         | '000 (ha)    | (ton)            |
| 1. 1978/79   | 3.0          | 10.4             | 31.3         | 0.7              | 8.6          | 6.0              | 0.3               | 8.0              | 2.4          | 0.1              | 9.0          | 0.9              |
| 2. 1979/80   | 3.1          | 11.0             | 34.1         | 0.7              | 8.7          | 6.1              | 0.3               | 8.7              | 2.6          | 0.1              | 10.0         | 1.0              |
| 3. 1980/81   | 3.3          | 10.8             | 35.7         | 0.8              | 8.0          | 6.4              | 0.3               | 9.3              | 2.8          | 0.1              | 12.0         | 1.2              |
| 4. 1981/82   | 3.5          | 10.6             | 37.1         | 0.8              | 8.4          | 6.7              | 0.3               | 9.7              | 2.9          | 0.1              | 13.0         | 1.3              |
| 5. 1982/83   | 3.8          | 11.5             | 43.6         | 0.9              | 7.9          | 7.1              | 0.3               | 10.7             | 3.2          | 0.1              | 14.0         | 1.4              |
| 6. 1983/84   | 4.2          | 11.1             | 46.5         | 1.0              | 8.1          | 8.1              | 0.3               | 13.0             | 3.9          | 0.2              | 7.5          | 1.5              |
| 7. 1984/85   | 4.7          | 11.1             | 52.2         | 1.2              | 10.1         | 12.1             | 0.6               | 11.5             | 6.9          | 0.5              | 9.4          | 4.7              |
| 8. 1985/86   | 5.0          | 10.8             | 53.8         | 1.2              | 9.4          | 11.3             | 0.6               | 11.7             | 7.0          | 0.5              | 9.6          | 4.8              |
| 9. 1986/87   | N.A.         | N.A.             | 61.0         | 1.3              | 11.2         | 14.2             | 0.7               | 10.9             | 7.1          | 0.5              | 10.1         | 4.8              |
| 10. 1987/88  | N.A.         | N.A.             | N.A.         | 1.3              | 11.1         | 14.5             | 0.7               | 10.3             | 7.2          | 0.5              | 9.8          | 4.9              |
| Mean         | 3.8          | 13.0             | 49.4         | 1.0              | 9.3          | 9.3              | 0.4               | 11.5             | 4.6          | 0.3              | 9.0          | 2.7              |
| Last 5 years | 4.6          | 11.6             | 53.4         | 1.2              | 10.0         | 12.0             | 0.7               | 9.2              | 6.4          | 0.4              | 10.4         | 4.1              |

Source: Agricultural Statistics of Pakistan: MFC

TABLE C-13 CROP PRODUCTION, PLUM

| Year         | Pakistan               |                             |                | N.W.F.P.               |                             |                | Malakand Division      |                             |                | Swat District          |                             |                |
|--------------|------------------------|-----------------------------|----------------|------------------------|-----------------------------|----------------|------------------------|-----------------------------|----------------|------------------------|-----------------------------|----------------|
|              | Cropped Area '000 (ha) | Yield Production '000 (ton) | Yield (ton/ha) | Cropped Area '000 (ha) | Yield Production '000 (ton) | Yield (ton/ha) | Cropped Area '000 (ha) | Yield Production '000 (ton) | Yield (ton/ha) | Cropped Area '000 (ha) | Yield Production '000 (ton) | Yield (ton/ha) |
| 1. 1978/79   | 2.6                    | 36.5                        | 14.0           | 1.9                    | 26.9                        | 14.1           | 0.4                    | 4.0                         | 10.0           | 0.2                    | 10.0                        | 2.0            |
| 2. 1979/80   | 2.7                    | 32.1                        | 11.9           | 1.9                    | 21.2                        | 11.1           | 0.4                    | 4.2                         | 10.5           | 0.2                    | 6.5                         | 1.3            |
| 3. 1980/81   | 3.4                    | 38.2                        | 11.2           | 2.5                    | 27.2                        | 10.9           | 0.4                    | 4.4                         | 10.0           | 0.2                    | 11.0                        | 2.2            |
| 4. 1981/82   | 3.4                    | 38.2                        | 11.2           | 2.6                    | 27.5                        | 10.6           | 0.4                    | 4.9                         | 12.3           | 0.2                    | 12.0                        | 2.4            |
| 5. 1982/83   | 3.6                    | 40.4                        | 11.2           | 2.6                    | 28.4                        | 10.9           | 0.4                    | 5.0                         | 12.5           | 0.3                    | 8.7                         | 2.6            |
| 6. 1983/84   | 3.9                    | 42.8                        | 11.0           | 2.8                    | 29.4                        | 10.5           | 0.5                    | 5.4                         | 10.8           | 0.3                    | 9.3                         | 2.8            |
| 7. 1984/85   | 4.0                    | 43.8                        | 11.0           | 2.8                    | 30.0                        | 10.7           | 0.5                    | 5.6                         | 11.2           | 0.3                    | 9.7                         | 2.9            |
| 8. 1985/86   | 4.1                    | 44.2                        | 10.8           | 2.8                    | 30.0                        | 10.7           | 0.5                    | 5.6                         | 11.2           | 0.3                    | 9.7                         | 2.9            |
| 9. 1986/87   | N.A.                   | N.A.                        | N.A.           | 2.8                    | 30.5                        | 10.9           | 0.5                    | 5.7                         | 11.4           | 0.3                    | 10.0                        | 3.0            |
| 10. 1987/88  | N.A.                   | N.A.                        | N.A.           | 2.8                    | 30.6                        | 10.9           | 0.5                    | 5.7                         | 11.4           | 0.3                    | 10.0                        | 3.0            |
| Mean         | 3.5                    | 39.5                        | 11.3           | 2.6                    | 28.2                        | 10.8           | 0.5                    | 5.1                         | 10.2           | 0.3                    | 8.3                         | 2.5            |
| Last 5 years | 4.0                    | 43.6                        | 10.9           | 2.8                    | 30.1                        | 10.8           | 0.5                    | 5.6                         | 11.2           | 0.3                    | 9.7                         | 2.9            |

Source: Agricultural Statistics of Pakistan: MFC

TABLE C-14 CROP PRODUCTION, PEARS

| Year         | Pakistan                  |                                   | N.W.F.P.                  |                                   | Malakand Division         |                                   | Swat District             |                                   |
|--------------|---------------------------|-----------------------------------|---------------------------|-----------------------------------|---------------------------|-----------------------------------|---------------------------|-----------------------------------|
|              | Cropped Area<br>'000 (ha) | Yield Production<br>'000 (ton/ha) | Cropped Area<br>'000 (ha) | Yield Production<br>'000 (ton/ha) | Cropped Area<br>'000 (ha) | Yield Production<br>'000 (ton/ha) | Cropped Area<br>'000 (ha) | Yield Production<br>'000 (ton/ha) |
| 1. 1978/79   | 3.3                       | 10.1                              | 1.9                       | 12.2                              | 0.4                       | 17.8                              | 0.3                       | 19.0                              |
| 2. 1979/80   | 2.6                       | 10.7                              | 1.9                       | 12.4                              | 0.4                       | 18.3                              | 0.3                       | 19.3                              |
| 3. 1980/81   | 3.0                       | 11.2                              | 2.3                       | 12.6                              | 0.5                       | 15.4                              | 0.3                       | 20.3                              |
| 4. 1981/82   | 3.1                       | 10.7                              | 2.4                       | 12.2                              | 0.5                       | 15.8                              | 0.4                       | 15.5                              |
| 5. 1982/83   | 3.1                       | 10.9                              | 2.4                       | 12.4                              | 0.5                       | 16.4                              | 0.4                       | 15.8                              |
| 6. 1983/84   | 2.8                       | 12.0                              | 2.4                       | 12.6                              | 0.5                       | 16.6                              | 0.4                       | 16.0                              |
| 7. 1984/85   | 2.9                       | 11.8                              | 2.5                       | 12.3                              | 0.5                       | 17.2                              | 0.4                       | 16.3                              |
| 8. 1985/86   | 2.9                       | 11.7                              | 2.5                       | 12.2                              | 0.5                       | 17.4                              | 0.4                       | 16.5                              |
| 9. 1986/87   | N.A.                      | N.A.                              | 2.5                       | 12.3                              | 0.5                       | 17.4                              | 0.4                       | 16.5                              |
| 10. 1987/88  | N.A.                      | N.A.                              | 2.5                       | 12.4                              | 0.5                       | 17.4                              | 0.4                       | 16.5                              |
| Mean         | 3.0                       | 11.0                              | 2.3                       | 12.5                              | 0.5                       | 17.2                              | 0.4                       | 15.5                              |
| Last 5 years | 2.9                       | 11.7                              | 2.5                       | 12.3                              | 0.5                       | 17.0                              | 0.4                       | 16.3                              |

Source: Agricultural Statistics of Pakistan: MFC

TABLE C-15 CROP PRODUCTION, WHEAT

| Year           | Pakistan     |                  |          | N.W.F.P.     |                  |          | Malakand Division |                  |          | Swat District |                  |          |
|----------------|--------------|------------------|----------|--------------|------------------|----------|-------------------|------------------|----------|---------------|------------------|----------|
|                | Cropped Area | Yield Production |          | Cropped Area | Yield Production |          | Cropped Area      | Yield Production |          | Cropped Area  | Yield Production |          |
|                | '000 (ha)    | (ton)            | (ton/ha) | '000 (ha)    | (ton)            | (ton/ha) | '000 (ha)         | (ton)            | (ton/ha) | '000 (ha)     | (ton)            | (ton/ha) |
| 1. 1978/79     | 6,923.7      | 9,950.0          | 1.49     | 704.7        | 737.5            | 1.05     | 85.9              | 103.8            | 1.21     | 25.6          | 32.8             | 1.28     |
| 2. 1979/80     | 6,983.7      | 10,856.5         | 1.57     | 757.5        | 862.5            | 1.14     | 132.3             | 160.1            | 1.21     | 57.3          | 56.8             | 0.99     |
| 3. 1980/81     | 7,222.9      | 11,474.6         | 1.64     | 790.4        | 940.8            | 1.19     | 122.0             | 147.3            | 1.21     | 50.2          | 51.3             | 1.02     |
| 4. 1981/82     | 7,397.9      | 11,304.2         | 1.56     | 813.2        | 962.2            | 1.18     | 141.0             | 163.5            | 1.16     | 66.3          | 65.2             | 0.98     |
| 5. 1982/83     | 7,397.9      | 12,414.4         | 1.68     | 824.5        | 998.4            | 1.21     | 161.2             | 182.7            | 1.13     | 87.0          | 83.5             | 0.96     |
| 6. 1983/84     | 7,343.2      | 10,881.9         | 1.48     | 793.6        | 859.8            | 1.08     | 154.4             | 164.9            | 1.07     | 81.2          | 73.1             | 0.90     |
| 7. 1984/85     | 7,258.5      | 11,703.0         | 1.61     | 785.6        | 872.1            | 1.11     | 155.4             | 170.9            | 1.10     | 81.8          | 74.2             | 0.91     |
| 8. 1985/86     | 7,408.3      | 13,923.0         | 1.88     | 781.9        | 906.5            | 1.16     | 156.6             | 176.7            | 1.12     | 82.0          | 79.7             | 0.97     |
| 9. 1986/87     | 7,706.0      | 12,882.0         | 1.89     | 802.8        | 959.4            | 1.19     | 179.9             | 220.2            | 1.22     | 104.9         | 119.9            | 1.14     |
| 10. 1987/88(E) | 7,245.0      | 12,700.0         | 1.75     | 756.5        | 899.2            | 1.19     | 188.1             | 213.9            | 1.14     | 114.4         | 124.7            | 1.09     |
| Mean           | 7,288.7      | 11,809.0         | 1.62     | 781.1        | 899.8            | 1.15     | 147.7             | 170.4            | 1.15     | 75.1          | 76.1             | 1.01     |
| Last 5 years   | 7,392.2      | 12,418.0         | 1.68     | 784.1        | 899.4            | 1.14     | 166.9             | 189.3            | 1.13     | 92.9          | 94.3             | 1.01     |

Source: Agricultural Statistics of Pakistan: MFC



TABLE C-16 CROP PRODUCTION, BARLEY

| Year           | Pakistan               |                        | N.W.F.P.               |                        | Malakand Division      |                        | Swat District          |                        |
|----------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
|                | Cropped Area ('000 ha) | Yield Production (ton) | Cropped Area ('000 ha) | Yield Production (ton) | Cropped Area ('000 ha) | Yield Production (ton) | Cropped Area ('000 ha) | Yield Production (ton) |
| 1. 1978/79     | 177.7                  | 0.73                   | 129.3                  | 0.81                   | 49.7                   | 1.05                   | 15.2                   | 1.05                   |
| 2. 1979/80     | 159.3                  | 0.74                   | 118.1                  | 0.80                   | 43.6                   | 1.07                   | 14.7                   | 0.40                   |
| 3. 1980/81     | 259.4                  | 0.68                   | 175.5                  | 0.82                   | 52.2                   | 0.90                   | 17.7                   | 0.97                   |
| 4. 1981/82     | 221.6                  | 0.71                   | 157.5                  | 0.83                   | 56.9                   | 1.10                   | 18.8                   | 0.97                   |
| 5. 1982/83     | 263.1                  | 0.70                   | 185.3                  | 0.82                   | 62.8                   | 1.11                   | 20.0                   | 1.00                   |
| 6. 1983/84     | 199.9                  | 0.70                   | 139.5                  | 0.73                   | 62.1                   | 1.04                   | 18.8                   | 0.92                   |
| 7. 1984/85     | 190.0                  | 0.69                   | 131.6                  | 0.73                   | 62.2                   | 1.04                   | 18.9                   | 0.92                   |
| 8. 1985/86     | 188.8                  | 0.71                   | 133.7                  | 0.75                   | 60.1                   | 1.03                   | 19.1                   | 0.92                   |
| 9. 1986/87     | 182.0                  | 0.71                   | 134.0                  | 0.78                   | 64.3                   | 1.11                   | 21.7                   | 1.12                   |
| 10. 1987/88(E) | 143.0                  | 0.76                   | 109.0                  | 0.86                   | 52.0                   | 1.03                   | 20.6                   | 1.14                   |
| Mean           | 198.5                  | 0.71                   | 141.4                  | 0.77                   | 55.6                   | 1.05                   | 18.6                   | 0.96                   |
| Last 5 years   | 180.7                  | 0.72                   | 129.6                  | 0.76                   | 60.1                   | 1.05                   | 19.8                   | 1.03                   |

Source: Agricultural Statistics of Pakistan: MFC

TABLE C-17 CROP PRODUCTION, RAPE AND MUSTARD

| Year         | Pakistan     |                  |          | N.W.F.P.     |                  |          | Malakand Division |                  |          | Swat District     |                  |          |
|--------------|--------------|------------------|----------|--------------|------------------|----------|-------------------|------------------|----------|-------------------|------------------|----------|
|              | Cropped Area | Yield Production |          | Cropped Area | Yield Production |          | Cropped Area      | Yield Production |          | Cropped Area      | Yield Production |          |
|              | '000 (ha)    | (ton)            | (ton/ha) | '000 (ha)    | (ton)            | (ton/ha) | '000 (ha)         | (ton)            | (ton/ha) | '000 (ha)         | (ton)            | (ton/ha) |
| 1. 1978/79   | 433.0        | 248.2            | 0.57     | 50.7         | 26.9             | 0.53     | 15.6              | 8.7              | 0.57     | 8.3               | 4.8              | 0.57     |
| 2. 1979/80   | 409.4        | 247.1            | 0.60     | 42.6         | 20.5             | 0.48     | 11.6              | 4.2              | 0.36     | 6.9               | 1.6              | 0.23     |
| 3. 1980/81   | 417.0        | 252.5            | 0.61     | 41.6         | 21.1             | 0.51     | 13.7              | 6.2              | 0.45     | 4.4               | 1.0              | 0.23     |
| 4. 1981/82   | 390.9        | 238.8            | 0.61     | 46.0         | 22.5             | 0.48     | 11.1              | 5.1              | 0.45     | 4.3               | 1.4              | 0.32     |
| 5. 1982/83   | 385.5        | 246.0            | 0.64     | 44.2         | 21.2             | 0.48     | 14.3              | 7.2              | 0.50     | 4.3               | 1.6              | 0.37     |
| 6. 1983/84   | 313.3        | 217.0            | 0.69     | 43.0         | 18.2             | 0.42     | 13.3              | 6.3              | 0.47     | 3.7               | 1.3              | 0.35     |
| 7. 1984/85   | 346.9        | 234.8            | 0.68     | 50.9         | 21.9             | 0.43     | 13.3              | 6.3              | 0.47     | 3.7               | 1.2              | 0.32     |
| 8. 1985/86   | 350.6        | 249.9            | 0.71     | 36.4         | 16.1             | 0.44     | 13.4              | 6.9              | 0.51     | 3.7               | 1.7              | 0.46     |
| 9. 1986/87   | 303.0        | 213.0            | 0.72     | 40.6         | 17.8             | 0.44     | 12.8              | 6.2              | 0.49     | 3.1               | 1.1              | 0.35     |
| 10. 1987/88  | 295.0        | 213.0            | 0.72     | 33.3         | 12.7             | 0.38     | 13.1              | 5.8              | 0.44     | 3.5               | 1.3              | 0.36     |
| Mean         | 364.5        | 236.0            | 0.65     | 42.9         | 19.9             | 0.46     | 13.2              | 6.3              | 0.47     | 5.5 $\frac{1}{2}$ | 2.2              | 0.40     |
| Last 5 years | 321.8        | 225.5            | 0.70     | 40.8         | 17.3             | 0.43     | 13.2              | 6.3              | 0.47     | 3.5               | 1.3              | 0.37     |

Source: Agricultural Statistics of Pakistan: MFC

Note : About 96 percent of the cropped area are under rainfed condition.

TABLE C-18 CROP PRODUCTION, ONION

| Year         | Pakistan               |                        | N.W.F.P.               |                        | Malakand Division      |                        | Swat District          |                        |     |      |      |
|--------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|-----|------|------|
|              | Cropped Area ('000 ha) | Yield Production (ton) | Cropped Area ('000 ha) | Yield Production (ton) | Cropped Area ('000 ha) | Yield Production (ton) | Cropped Area ('000 ha) | Yield Production (ton) |     |      |      |
| 1. 1978/79   | 38.7                   | 10.1                   | 389.7                  | 2.1                    | 12.3                   | 25.8                   | 1.0                    | 14.4                   | 0.7 | 15.3 | 10.7 |
| 2. 1979/80   | 41.9                   | 10.4                   | 434.0                  | 2.6                    | 12.1                   | 31.4                   | 1.0                    | 14.7                   | 0.7 | 15.6 | 10.9 |
| 3. 1980/81   | 43.2                   | 10.4                   | 447.6                  | 2.4                    | 12.2                   | 29.2                   | 1.3                    | 13.7                   | 0.9 | 14.8 | 13.3 |
| 4. 1981/82   | 43.4                   | 10.4                   | 451.8                  | 2.6                    | 11.9                   | 30.9                   | 1.3                    | 14.1                   | 0.9 | 15.2 | 13.7 |
| 5. 1982/83   | 45.3                   | 10.5                   | 474.8                  | 2.3                    | 12.4                   | 28.3                   | 1.3                    | 13.8                   | 0.9 | 14.9 | 13.4 |
| 6. 1983/84   | 47.3                   | 10.6                   | 503.4                  | 2.7                    | 12.4                   | 32.8                   | 1.5                    | 14.0                   | 1.1 | 14.7 | 16.2 |
| 7. 1984/85   | 48.2                   | 10.7                   | 514.6                  | 2.9                    | 12.3                   | 36.4                   | 1.5                    | 14.3                   | 1.1 | 14.9 | 16.4 |
| 8. 1985/86   | 49.4                   | 10.6                   | 524.7                  | 3.0                    | 12.7                   | 38.1                   | 1.5                    | 14.3                   | 1.1 | 15.0 | 16.5 |
| 9. 1986/87   | N.A.                   | N.A.                   | N.A.                   | 3.9                    | 13.0                   | 50.9                   | 2.3                    | 14.2                   | 1.9 | 15.3 | 29.0 |
| 10. 1987/88  | N.A.                   | N.A.                   | N.A.                   | 4.7                    | 14.0                   | 65.9                   | 2.8                    | 16.2                   | 2.3 | 17.4 | 40.2 |
| Mean         | 44.6                   | 10.2                   | 455.1                  | 2.9                    | 12.8                   | 37.0                   | 1.6                    | 14.2                   | 1.1 | 16.4 | 18.0 |
| Last 5 years | 48.3                   | 10.6                   | 514.2                  | 3.4                    | 13.2                   | 44.8                   | 1.9                    | 15.1                   | 1.5 | 15.9 | 23.6 |

Source: Agricultural Statistics of Pakistan: MFC

Note : About 96 percent of the total cropped area are under irrigation

TABLE C-19 CROP PRODUCTION, CITRUS FRUIT

| Year         | Pakistan     |                  |              | N.W.F.P.         |              |                  | Malakand Division |                  |              | Swat District    |              |                  |
|--------------|--------------|------------------|--------------|------------------|--------------|------------------|-------------------|------------------|--------------|------------------|--------------|------------------|
|              | Cropped Area | Yield Production | Cropped Area | Yield Production | Cropped Area | Yield Production | Cropped Area      | Yield Production | Cropped Area | Yield Production | Cropped Area | Yield Production |
|              | '000 (ha)    | (ton) '000       | '000 (ha)    | (ton) '000       | '000 (ha)    | (ton) '000       | '000 (ha)         | (ton) '000       | '000 (ha)    | (ton) '000       | '000 (ha)    | (ton) '000       |
| 1. 1978/79   | 72.2         | 10.2             | 737.1        | 3.0              | 8.3          | 24.8             | 1.5               | 7.7              | 11.5         | 0.7              | 7.4          | 5.2              |
| 2. 1979/80   | 86.7         | 10.0             | 870.6        | 3.0              | 8.5          | 25.5             | 1.5               | 7.9              | 11.9         | 0.7              | 7.7          | 5.4              |
| 3. 1980/81   | 94.5         | 9.8              | 926.2        | 3.1              | 8.5          | 26.3             | 1.6               | 7.6              | 12.1         | 0.7              | 8.0          | 5.6              |
| 4. 1981/82   | 118.0        | 9.8              | 1,159.8      | 3.2              | 8.4          | 27.0             | 1.6               | 7.8              | 12.4         | 0.8              | 7.4          | 5.9              |
| 5. 1982/83   | 124.7        | 10.0             | 1,245.1      | 3.3              | 8.3          | 27.3             | 1.6               | 7.7              | 12.6         | 0.8              | 7.3          | 5.9              |
| 6. 1983/84   | 136.2        | 9.5              | 1,300.3      | 3.3              | 8.5          | 28.0             | 1.6               | 7.9              | 12.7         | 0.8              | 7.4          | 5.9              |
| 7. 1984/85   | 144.1        | 9.5              | 1,372.9      | 3.4              | 8.3          | 28.3             | 1.7               | 7.6              | 12.9         | 0.8              | 7.5          | 6.0              |
| 8. 1985/86   | 149.7        | 9.6              | 1,434.5      | 3.4              | 8.4          | 28.6             | 1.7               | 7.6              | 13.0         | 0.8              | 7.5          | 6.0              |
| 9. 1986/87   | N.A.         | N.A.             | 1,465.0      | 3.4              | 8.5          | 29.0             | 1.7               | 7.6              | 13.0         | 0.8              | 7.5          | 6.0              |
| 10. 1987/88  | N.A.         | N.A.             | N.A.         | 3.7              | 8.2          | 30.4             | 1.7               | 7.6              | 13.0         | 0.8              | 7.5          | 6.0              |
| Mean         | 115.8        | 10.1             | 1,167.9      | 3.3              | 8.3          | 27.5             | 1.6               | 7.8              | 12.5         | 0.8              | 4.5          | 3.6              |
| Last 5 years | 143.3        | 9.7              | 1,393.2      | 3.4              | 8.5          | 28.9             | 1.7               | 7.6              | 12.9         | 0.8              | 3.5          | 2.8              |

Source: Agricultural Statistics of Pakistan: MFC

TABLE C-20 SUMMARY ON CROP YIELD IN THE PROJECT AREA

| Crop                         | Irrigated<br>(ton/ha) | Unirrigated<br>(ton/ha) |
|------------------------------|-----------------------|-------------------------|
| 1. Kharif Crops              |                       |                         |
| (1) Maize                    | 1.80                  | 1.10                    |
| (2) Rabi                     | 1.60                  | -                       |
| (3) Pulses (Black Gram)      | 0.80                  | * 0.60                  |
| (4) Potato                   | 11.20                 | 6.90                    |
| (5) Vegetables (Tomato)      | 11.70                 | * 6.10                  |
| (6) Fodders (Maize)          | 18.60                 | * 11.20                 |
| 2. Rabi Crops                |                       |                         |
| (1) Wheat                    | 1.60                  | 0.80                    |
| (2) Barley                   | 1.20                  | 1.00                    |
| (3) Rape & Mustard           | 0.60                  | 0.40                    |
| (4) Pulses (Lentil)          | 1.00                  | 0.70                    |
| (5) Onion                    | 16.10                 | 7.30                    |
| (6) Vegetables (Cauliflower) | 9.00                  | * 5.40                  |
| (7) Fodders (Shaftal)        | 18.90                 | * 11.30                 |
| 3. Sugarcane                 | 38.00                 | 21.80                   |
| 4. Fruits (Apple)            | 12.70                 | 7.60                    |

Note : \* Estimated yields

Source: Agricultural Statistics

TABLE C-21 CROP PRODUCTION IN SWAT DISTRICT (1)

| Crop                        | Year    | Total        |                   |                     | Irrigated    |                   |                     | Unirrigated  |                   |                     |
|-----------------------------|---------|--------------|-------------------|---------------------|--------------|-------------------|---------------------|--------------|-------------------|---------------------|
|                             |         | Area<br>(ha) | Yield<br>(ton/ha) | Production<br>(ton) | Area<br>(ha) | Yield<br>(ton/ha) | Production<br>(ton) | Area<br>(ha) | Yield<br>(ton/ha) | Production<br>(ton) |
| Maize                       | 1983/84 | 94,947       | 1.27              | 120,263             | 23,731       | 1.71              | 40,500              | 71,216       | 1.12              | 79,763              |
|                             | 1984/85 | 98,700       | 1.25              | 123,745             | 25,100       | 1.71              | 42,828              | 73,600       | 1.10              | 80,917              |
|                             | 1985/86 | 98,000       | 1.29              | 126,074             | 25,150       | 1.83              | 45,997              | 72,850       | 1.01              | 80,077              |
|                             | 1986/87 | 98,250       | 1.43              | 140,860             | 25,250       | 1.88              | 47,561              | 73,000       | 1.28              | 93,299              |
|                             | 1987/88 | 141,322      | 1.18              | 166,163             | 24,381       | 1.79              | 43,607              | 116,941      | 1.05              | 122,496             |
|                             | Average | 106,244      | 1.27              | 135,421             | 24,722       | 1.78              | 44,111              | 81,521       | 1.12              | 91,310              |
| Rice                        | 1983/84 | 20,475       | 1.55              | 31,754              | 20,475       | 1.55              | 31,754              |              |                   |                     |
|                             | 1984/85 | 20,600       | 1.55              | 32,000              | 20,600       | 1.55              | 32,000              |              |                   |                     |
|                             | 1985/86 | 20,630       | 1.57              | 32,340              | 20,630       | 1.57              | 32,340              |              |                   |                     |
|                             | 1986/87 | 20,635       | 1.59              | 32,740              | 20,635       | 1.59              | 32,740              |              |                   |                     |
|                             | 1987/88 | 9,698        | 1.73              | 16,733              | 9,698        | 1.73              | 16,733              |              |                   |                     |
|                             | Average | 18,408       | 1.58              | 29,113              | 18,408       | 1.53              | 29,113              |              |                   |                     |
| Black Gram                  | 1983/84 | 2,964        | 0.83              | 2,460               | 2,964        | 0.83              | 2,460               |              |                   |                     |
|                             | 1984/85 | 2,970        | 0.83              | 2,465               | 2,970        | 0.83              | 2,465               |              |                   |                     |
|                             | 1985/86 | 2,970        | 0.83              | 2,467               | 2,970        | 0.83              | 2,467               |              |                   |                     |
|                             | 1986/87 | 3,045        | 0.83              | 2,529               | 3,045        | 0.83              | 2,529               |              |                   |                     |
|                             | 1987/88 | 1,187        | 0.09              | 114                 | 1,170        | 0.08              | 99                  |              |                   |                     |
|                             | Average | 2,627        | 0.76              | 2,007               | 2,624        | 0.76              | 2,004               |              |                   |                     |
| Potato                      | 1983/84 | 2,883        | 9.71              | 27,980              | 2,521        | 10.16             | 25,615              | 362          | 6.53              | 2,365               |
|                             | 1984/85 | 2,905        | 9.77              | 28,377              | 2,546        | 10.16             | 25,868              | 359          | 6.99              | 2,509               |
|                             | 1985/86 | 2,975        | 9.73              | 28,945              | 2,560        | 10.18             | 26,061              | 415          | 6.95              | 2,884               |
|                             | 1986/87 | 2,980        | 12.42             | 37,003              | 2,750        | 12.41             | 34,154              | 410          | 6.95              | 2,849               |
|                             | 1987/88 | 2,463        | 12.30             | 30,300              | 1,958        | 13.68             | 26,787              | 505          | 6.96              | 3,513               |
|                             | Average | 2,841        | 10.74             | 30,521              | 2,467        | 11.23             | 27,697              | 410          | 6.89              | 2,824               |
| Tomato<br>(Kharif)          | 1983/84 | N.A.         | N.A.              | N.A.                | N.A.         | N.A.              | N.A.                |              |                   |                     |
|                             | 1984/85 | N.A.         | N.A.              | N.A.                | N.A.         | N.A.              | N.A.                |              |                   |                     |
|                             | 1985/86 | 1,181        | 11.74             | 13,876              | 1,181        | 11.74             | 13,876              |              |                   |                     |
|                             | 1986/87 | 1,190        | 11.74             | 13,979              | 1,190        | 11.74             | 13,979              |              |                   |                     |
|                             | 1987/88 | 1,454        | 11.58             | 16,849              | 1,458        | 11.56             | 16,849              |              |                   |                     |
|                             | Average | 1,275        | 11.68             | 14,901              | 1,276        | 11.68             | 14,901              |              |                   |                     |
| Kharif<br>Fodder<br>(Maize) | 1983/84 | N.A.         | N.A.              | N.A.                |              |                   |                     |              |                   |                     |
|                             | 1984/85 | N.A.         | N.A.              | N.A.                |              |                   |                     |              |                   |                     |
|                             | 1985/86 | 2,192        | 18.60             | 40,765              |              |                   |                     |              |                   |                     |
|                             | 1986/87 | 2,195        | 18.60             | 40,822              |              |                   |                     |              |                   |                     |
|                             | 1987/88 | 6,966        | 18.56             | 129,291             |              |                   |                     |              |                   |                     |
|                             | Average | 3,784        | 18.58             | 70,293              |              |                   |                     |              |                   |                     |
| Sugarcane                   | 1983/84 | 2,380        | 34.96             | 83,210              | 1,943        | 37.90             | 73,640              | 435          | 22.00             | 9,570               |
|                             | 1984/85 | 2,385        | 34.69             | 82,729              | 1,917        | 37.85             | 72,563              | 468          | 21.72             | 10,166              |
|                             | 1985/86 | 2,385        | 33.30             | 79,347              | 1,925        | 36.00             | 69,355              | 460          | 21.70             | 9,992               |
|                             | 1986/87 | 2,390        | 37.17             | 88,831              | 1,930        | 40.85             | 78,839              | 460          | 21.72             | 9,992               |
|                             | 1987/88 | 1,062        | 32.14             | 34,134              | 738          | 36.72             | 27,097              | 324          | 21.72             | 7,038               |
|                             | Average | 2,120        | 34.74             | 73,650              | 1,691        | 38.02             | 64,299              | 429          | 21.80             | 9,352               |
| Apple                       | 1983/84 | 2,040        | 13.00             | 26,530              | 2,040        | 13.00             | 26,530              |              |                   |                     |
|                             | 1984/85 | 2,050        | 13.00             | 26,660              | 2,050        | 13.00             | 26,660              |              |                   |                     |
|                             | 1985/86 | 2,055        | 13.00             | 26,725              | 2,055        | 13.00             | 26,725              |              |                   |                     |
|                             | 1986/87 | 2,063        | 13.00             | 26,830              | 2,063        | 13.00             | 26,830              |              |                   |                     |
|                             | 1987/88 | 2,359        | 11.41             | 26,921              | 2,359        | 11.41             | 26,921              |              |                   |                     |
|                             | Average | 2,113        | 12.65             | 26,733              | 2,113        | 12.65             | 26,733              |              |                   |                     |

(Continued)

TABLE C-22 CROP PRODUCTION IN SWAT DISTRICT (2)

| Crop                 | Year    | Total        |                   |                     | Irrigated    |                   |                     | Unirrigated  |                   |                     |
|----------------------|---------|--------------|-------------------|---------------------|--------------|-------------------|---------------------|--------------|-------------------|---------------------|
|                      |         | Area<br>(ha) | Yield<br>(ton/ha) | Production<br>(ton) | Area<br>(ha) | Yield<br>(ton/ha) | Production<br>(ton) | Area<br>(ha) | Yield<br>(ton/ha) | Production<br>(ton) |
| Wheat                | 1983/84 | 81,185       | 0.90              | 73,117              | 23,585       | 1.57              | 36,940              | 57,602       | 0.63              | 36,177              |
|                      | 1984/85 | 81,850       | 0.91              | 74,144              | 23,650       | 1.57              | 37,104              | 58,200       | 0.64              | 37,040              |
|                      | 1985/86 | 81,950       | 0.97              | 79,726              | 23,750       | 1.69              | 40,150              | 58,200       | 0.68              | 39,576              |
|                      | 1986/87 | 104,914      | 1.14              | 119,992             | 20,200       | 1.69              | 34,050              | 84,714       | 1.01              | 85,942              |
|                      | 1987/88 | 114,443      | 1.09              | 124,746             | 20,377       | 1.66              | 33,821              | 94,066       | 0.97              | 90,925              |
|                      | Average | 92,868       | 1.01              | 94,345              | 22,312       | 1.63              | 36,413              | 70,556       | 0.82              | 57,932              |
| Barley               | 1983/84 | 2,372        | 0.92              | 2,187               | 97           | 1.16              | 113                 | 2,275        | 0.91              | 2,074               |
|                      | 1984/85 | 2,420        | 0.91              | 2,210               | 160          | 1.16              | 186                 | 2,260        | 0.89              | 2,024               |
|                      | 1985/86 | 2,420        | 0.91              | 2,212               | 155          | 1.17              | 182                 | 2,265        | 0.90              | 2,030               |
|                      | 1986/87 | 5,177        | 1.11              | 5,747               | 480          | 1.17              | 563                 | 4,697        | 1.11              | 5,184               |
|                      | 1987/88 | 4,268        | 1.14              | 4,849               | 424          | 1.17              | 497                 | 3,844        | 1.13              | 4,352               |
|                      | Average | 3,331        | 1.03              | 3,441               | 263          | 1.17              | 308                 | 3,068        | 1.02              | 3,133               |
| Rape & Mustard       | 1983/84 | 3,684        | 0.34              | 1,265               | 23           | 0.56              | 13                  | 3,661        | 0.34              | 1,252               |
|                      | 1984/85 | 3,685        | 0.34              | 1,260               | 31           | 0.58              | 18                  | 3,654        | 0.34              | 1,242               |
|                      | 1985/86 | 3,689        | 0.45              | 1,646               | 31           | 0.58              | 18                  | 3,658        | 0.44              | 1,628               |
|                      | 1986/87 | 3,070        | 0.37              | 1,137               | 137          | 0.58              | 80                  | 2,933        | 0.36              | 1,057               |
|                      | 1987/88 | 3,485        | 0.36              | 1,272               | 173          | 0.58              | 101                 | 3,312        | 0.35              | 1,171               |
|                      | Average | 3,523        | 0.37              | 1,316               | 79           | 0.58              | 46                  | 3,444        | 0.37              | 1,270               |
| Lentil               | 1983/84 | 100          | 0.86              | 86                  |              |                   |                     |              |                   |                     |
|                      | 1984/85 | 102          | 0.85              | 87                  |              |                   |                     |              |                   |                     |
|                      | 1985/86 | 103          | 0.85              | 88                  |              |                   |                     | 103          | 0.85              | 88                  |
|                      | 1986/87 | 1,455        | 0.86              | 1,248               | 27           | 1.00              | 27                  | 1,428        | 0.86              | 1,221               |
|                      | 1987/88 | 1,510        | 0.53              | 805                 | 23           | 1.00              | 23                  | 1,487        | 0.86              | 782                 |
|                      | Average | 654          | 0.71              | 463                 | 25           | 1.00              | 25                  | 1,006        | 0.69              | 697                 |
| Onion                | 1983/84 | 1,055        | 15.39             | 16,238              | 1,050        | 15.40             | 16,168              | 5            | 14.00             | 70                  |
|                      | 1984/85 | 1,065        | 15.10             | 16,089              | 1,062        | 15.13             | 16,068              | 3            | 10.30             | 21                  |
|                      | 1985/86 | 1,067        | 15.44             | 16,517              | 1,067        | 15.46             | 16,496              | 3            | 7.00              | 21                  |
|                      | 1986/87 | 1,918        | 15.13             | 29,018              | 1,843        | 15.46             | 28,493              | 75           | 7.00              | 525                 |
|                      | 1987/88 | 2,315        | 17.38             | 40,240              | 2,245        | 17.71             | 39,750              | 70           | 7.00              | 490                 |
|                      | Average | 1,484        | 15.92             | 23,620              | 1,453        | 16.10             | 23,395              | 31           | 7.27              | 225                 |
| Cauliflower          | 1983/84 | N.A.         | N.A.              | N.A.                | N.A.         | N.A.              | N.A.                |              |                   |                     |
|                      | 1984/85 | N.A.         | N.A.              | N.A.                | N.A.         | N.A.              | N.A.                |              |                   |                     |
|                      | 1985/86 | 202          | 9.05              | 1,828               | 202          | 9.05              | 1,828               |              |                   |                     |
|                      | 1986/87 | 165          | 9.05              | 1,493               | 165          | 9.05              | 1,493               |              |                   |                     |
|                      | 1987/88 | 166          | 9.05              | 1,502               | 166          | 9.05              | 1,502               |              |                   |                     |
|                      | Average | 178          | 9.03              | 1,608               | 178          | 9.03              | 1,608               |              |                   |                     |
| Rabi Fodder (Shatal) | 1983/84 | N.A.         | N.A.              | N.A.                | N.A.         | N.A.              | N.A.                |              |                   |                     |
|                      | 1984/85 | N.A.         | N.A.              | N.A.                | N.A.         | N.A.              | N.A.                |              |                   |                     |
|                      | 1985/86 | 8,089        | 15.78             | 127,682             | 6,120        | 17.39             | 106,400             | 1,978        | 10.76             | 21,282              |
|                      | 1986/87 | 8,550        | 16.60             | 141,925             | 7,564        | 16.16             | 122,205             | 986          | 20.00             | 19,720              |
|                      | 1987/88 | 12,149       | 15.63             | 189,918             | 9,189        | 17.48             | 160,661             | 2,960        | 9.88              | 29,257              |
|                      | Average | 9,596        | 15.96             | 153,175             | 7,624        | 17.01             | 129,755             | 1,974        | 11.86             | 23,420              |
| Citrus               | 1983/84 | 760          | 7.77              | 5,907               | 760          | 7.77              | 5,907               |              |                   |                     |
|                      | 1984/85 | 768          | 7.75              | 5,950               | 768          | 7.75              | 5,950               |              |                   |                     |
|                      | 1985/86 | 772          | 7.75              | 5,982               | 772          | 7.75              | 5,982               |              |                   |                     |
|                      | 1986/87 | 774          | 7.55              | 5,998               | 774          | 7.55              | 5,998               |              |                   |                     |
|                      | 1987/88 | 780          | 7.76              | 6,045               | 780          | 7.75              | 6,045               |              |                   |                     |
|                      | Average | 771          | 7.76              | 5,976               | 771          | 7.75              | 5,976               |              |                   |                     |

TABLE C-23 CROPPED AREA AND CROPPING INTENSITY (1986/87)  
(SWAT SUB-DIVISION)

| Crop                   | Irrigated    |                  | Unirrigated  |                  | Total        |                  |
|------------------------|--------------|------------------|--------------|------------------|--------------|------------------|
|                        | Area<br>(ha) | Intensity<br>(%) | Area<br>(ha) | Intensity<br>(%) | Area<br>(ha) | Intensity<br>(%) |
| 1. Kharif Crop         | 44,884       | 114.4            | 11,994       | 20.1             | 56,878       | 57.5             |
| (1) Maize              | 20,285       | 51.7             | 5,814        | 9.7              | 26,099       | 26.4             |
| (2) Rice               | 18,703       | 47.7             | -            | -                | 18,703       | 18.9             |
| (3) Pulses             | 1,265        | 3.2              | 3,382        | 5.7              | 4,647        | 4.7              |
| (4) Potato             | 2,570        | 6.6              | 410          | 0.7              | 2,980        | 3.0              |
| (5) Vegetables         | 1,500        | 3.8              | 23           | 0.0              | 1,523        | 11.5             |
| (6) Fodders and Others | 561          | 1.4              | 2,365        | 4.0              | 2,926        | 3.0              |
| 2. Rabi Crops          | 25,665       | 65.4             | 36,152       | 60.5             | 62,582       | 63.2             |
| (1) Wheat              | 15,440       | 39.4             | 28,854       | 48.3             | 45,055       | 45.5             |
| (2) Barley             | 365          | 0.9              | 2,793        | 4.7              | 3,158        | 3.2              |
| (3) Rape and Mustard   | 114          | 0.3              | 2,032        | 3.4              | 2,146        | 2.2              |
| (4) Pulses             | 132          | 0.3              | 1,432        | 2.4              | 1,564        | 1.6              |
| (5) Onion              | 1,837        | 4.7              | 48           | 0.0              | 1,885        | 1.9              |
| (6) Vegetables         | 1,000        | 2.5              | 70           | 0.0              | 1,070        | 1.1              |
| (7) Fodders and Others | 6,781        | 17.3             | 923          | 1.7              | 7,704        | 7.9              |
| 3. Sugarcane           | 1,160        | 3.0              | 296          | 0.5              | 1,456        | 1.5              |
| 4. Fruits              | 4,426        | 11.3             | 831          | 1.4              | 5,257        | 5.3              |
| Total                  | 76,135       | 194.1            | 49,273       | 82.5             | 119,460      | 120.7            |
| 5. Cultivated Area     | 39,220       |                  | 59,744       |                  | 98,964       |                  |

Source: Agricultural Statistical Office, Swat District



TABLE C-24 CROPPED AREA AND CROPPING INTENSITY (1986/87)  
(SHANGLA PAR SUB-DIVISION)

| Crop                   | Irrigated    |                  | Unirrigated  |                  | Total        |                  |
|------------------------|--------------|------------------|--------------|------------------|--------------|------------------|
|                        | Area<br>(ha) | Intensity<br>(%) | Area<br>(ha) | Intensity<br>(%) | Area<br>(ha) | Intensity<br>(%) |
| 1. Kharif Crop         |              |                  |              |                  |              |                  |
| (1) Maize              | 2,935        | 89.0             | 34,056       | 88.9             | 36,991       | 88.9             |
| (2) Rice               | 1,285        | 39.0             | 34,038       | 88.9             | 35,323       | 84.9             |
| (3) Pulses             | 1,580        | 47.9             | -            | -                | 1,580        | 3.8              |
| (4) Potato             | -            | -                | 18           | 0.0              | 18           | 0.0              |
| (5) Vegetables         | 70           | 2.2              | -            | -                | 70           | 0.2              |
| (6) Fodders and Others | -            | -                | -            | -                | -            | -                |
| 2. Rabi Crops          |              |                  |              |                  |              |                  |
| (1) Wheat              | 1,489        | 45.1             | 17,583       | 45.9             | 19,070       | 45.9             |
| (2) Barley             | 1,194        | 36.2             | 17,210       | 44.9             | 18,404       | 44.4             |
| (3) Rape and Mustard   | 23           | 0.7              | 281          | 0.7              | 304          | 0.7              |
| (4) Pulses             | 1            | 0.0              | 8            | 0.0              | 9            | 0.0              |
| (5) Onion              | -            | -                | -            | -                | -            | -                |
| (6) Vegetables         | 3            | 0.0              | -            | -                | 3            | 0.0              |
| (7) Fodders and Others | 22           | 0.7              | 20           | 0.0              | 40           | 0.1              |
|                        | 246          | 7.5              | 64           | 0.3              | 310          | 0.7              |
| 3. Sugarcane           | 32           | 1.0              | 48           | 0.1              | 80           | 0.2              |
| 4. Fruits              | 23           | 0.7              | 74           | 0.2              | 97           | 0.2              |
| Total                  | 4,479        | 135.8            | 51,761       | 135.1            | 56,240       | 135.2            |
| 5. Cultivated Area     | 3,298        |                  | 38,290       |                  | 41,588       |                  |

Source: Agricultural Statistical Office, Swat District

TABLE C-25 CROPPED AREA AND CROPPING INTENSITY (1986/87)  
(BUNER SUB-DIVISION)

| Crop                   | Irrigated    |                  | Unirrigated  |                  | Total        |                  |
|------------------------|--------------|------------------|--------------|------------------|--------------|------------------|
|                        | Area<br>(ha) | Intensity<br>(%) | Area<br>(ha) | Intensity<br>(%) | Area<br>(ha) | Intensity<br>(%) |
| 1. Kharif Crop         | 4,397        | 71.8             | 35,852       | 73.2             | 40,249       | 72.9             |
| (1) Maize              | 3,680        | 60.1             | 33,148       | 67.6             | 36,828       | 66.8             |
| (2) Rice               | 353          | 5.7              | -            | -                | 353          | 0.6              |
| (3) Pulses             | -            | -                | 2,480        | 5.1              | 2,480        | 4.5              |
| (4) Potato             | -            | -                | -            | -                | -            | -                |
| (5) Vegetables         | 100          | 1.6              | 50           | 0.1              | 150          | 0.3              |
| (6) Fodders and Others | 264          | 4.4              | 174          | 0.4              | 438          | 0.7              |
| 2. Rabi Crops          | 4,322        | 70.6             | 40,645       | 82.9             | 44,967       | 81.5             |
| (1) Wheat              | 3,566        | 58.3             | 37,889       | 77.2             | 41,455       | 75.1             |
| (2) Barley             | 92           | 1.5              | 1,623        | 3.3              | 1,715        | 3.1              |
| (3) Rape and Mustard   | 22           | 0.4              | 893          | 1.8              | 915          | 1.7              |
| (4) Pulses             | -            | -                | 75           | 0.2              | 75           | 0.1              |
| (5) Onion              | 3            | 0.0              | 27           | 0.0              | 30           | 0.1              |
| (6) Vegetables         | 100          | 1.6              | 100          | 0.2              | 200          | 0.4              |
| (7) Fodders and Others | 539          | 8.8              | 38           | 0.0              | 577          | 1.0              |
| 3. Sugarcane           | 738          | 12.1             | 116          | 0.2              | 854          | 1.5              |
| 4. Fruits              | 6            | 0.0              | 8            | 0.0              | 14           | 0.0              |
| Total                  | 9,463        | 154.5            | 76,621       | 156.3            | 86,084       | 155.9            |
| 5. Cultivated Area     | 6,121        |                  | 49,058       |                  | 55,179       |                  |

Source: Agricultural Statistical Office, Swat District

TABLE C-26 DISTRIBUTION OF CROP LOAN THROUGH  
AGRICULTURAL COOPERATIVES (1987/88)

| Sub-Division | No. of Beneficiaries | Loan Amount<br>(Rs. '000) | Repaid Amount<br>(Rs. '000) | Balance<br>(Rs. '000) | Ratio of Repayment<br>(%) |
|--------------|----------------------|---------------------------|-----------------------------|-----------------------|---------------------------|
| Swat         | 1,440                | 13,408                    | 9,200                       | 4,208                 | 68.6                      |
| Shangla Par  | 388                  | 3,824                     | 2,727                       | 1,097                 | 71.3                      |
| Buner        | 400                  | 3,850                     | 3,399                       | 451                   | 88.3                      |
| Total        | 2,228                | 21,882                    | 15,326                      | 5,756                 | 70.0                      |

Source: Assistant Registrar of Cooperative Societies, Swat

TABLE C-27 DISTRIBUTION OF AGRICULTURAL INPUTS AND FARM  
MACHINERY THROUGH AGRICULTURAL COOPERATIVES

| Item                            | Sub-Division |             |       | Total |       |
|---------------------------------|--------------|-------------|-------|-------|-------|
|                                 | Swat         | Shangla Par | Buner |       |       |
| <b>1. Fertilizer</b>            |              |             |       |       |       |
| - Urea                          | ton          | 77          | 31    | 42    | 150   |
| - Ammonium Sulfate              | "            | 56          | 24    | 20    | 100   |
| - D.A.P.                        | "            | 350         | 104   | 200   | 654   |
| <b>2. Seeds</b>                 |              |             |       |       |       |
| - Wheat                         | "            | 1,200       | 300   | 500   | 2,000 |
| - Maize                         | "            | 55          | 20    | 25    | 100   |
| - Sugarcane                     | "            | -           | 20    | 30    | 50    |
| - Potato                        | "            | 70          | 31    | -     | 101   |
| <b>3. Farm Machinery (Loan)</b> |              |             |       |       |       |
| - Tractor                       | unit         | 7           | 2     | 3     | 12    |
| - Pick up truck                 | "            | 13          | 4     | 5     | 22    |
| - Pump                          | "            | 20          | -     | 5     | 25    |
| - Dug Well                      | "            | 8           | -     | 2     | 10    |

Source: Assistant Registrar of Cooperative Societies, Swat

TABLE C-28 DISTRIBUTION OF IMPROVED SEEDS  
AND FRUIT SAPLINGS IN SWAT DISTRICT

| Item            | Unit        | Amount  |         |         | Remarks   |
|-----------------|-------------|---------|---------|---------|---|
|                 |             | 1985/86 | 1986/87 | Average |   |
| 1. Seeds        | ton         |         |         |         | Source:<br>Agricultural<br>Development<br>Authority |
| - Maize         | "           | 11.2    | 12.5    | 11.9    |   |
| - Paddy         | "           | 0.6     | -       | 0.3     |   |
| - Groundnut     | "           | -       | 0.6     | 0.3     |   |
| - Gram          | "           | -       | -       | -       |   |
| - Wheat         | "           | 165.6   | 165.0   | 165.3   |   |
| 2. Fruit Plants |             |         |         |         | Source:<br>Agriculture<br>Extension                 |
| - Apple         | No. of tree | N.A     | 7,213   | 7,213   |   |
| - Appricot      | "           | N.A     | 2,352   | 2,352   |   |
| - Plum          | "           | N.A     | 1,420   | 1,420   |   |
| - Peach         | "           | N.A     | 1,068   | 1,068   |   |
| - Walnut        | "           | N.A     | 4,150   | 4,150   |   |
| - Persimmon     | "           | N.A     | 3,041   | 3,041   |   |
| - Pear          | "           | N.A     | 157     | 157     |   |

TABLE C-29 OFF-TAKE OF FERTILIZER IN SWAT DISTRICT

(unit: ton)

| Nutrition Element | 1984/85 | 1985/86 | 1986/87 | Average |
|-------------------|---------|---------|---------|---------|
| N                 | 3,487   | 7,917   | 8,321   | 6,575   |
| P                 | 1,561   | 1,924   | 2,460   | 982     |
| K                 | 55      | 213     | 567     | 278     |
| Total             | 5,103   | 10,055  | 11,348  | 8,835   |

Source: Agricultural Development Authority N.W.F.P.

TABLE C-30 NUMBER OF AGRICULTURAL MACHINERY  
BY SUB-DIVISION (1989)

| Item                     | Swat              | Shangla<br>Par   | Buner             | Total             |
|--------------------------|-------------------|------------------|-------------------|-------------------|
| <b>1. Pumps</b>          |                   |                  |                   |                   |
| - Tubewell (pumps)       | 11                | -                | 25                | 36                |
| - Lift Pumps             | 603               | 82               | 75                | 760               |
| <b>Total</b>             | <b><u>614</u></b> | <b><u>82</u></b> | <b><u>100</u></b> | <b><u>796</u></b> |
| <b>2. Farm Machinery</b> |                   |                  |                   |                   |
| (1) Tractors             | 1,073             | 65               | 415               | 1,553             |
| (2) Wheat Threshers      | 155               | 10               | 70                | 235               |
| (3) Rice Husker          | 152               | 44               | 8                 | 204               |
| (4) Maize Sheller        | 122               | 4                | 90                | 216               |
| (5) Wheat Harvester      | 1                 | -                | -                 | 1                 |
| <b>3. Buldozer</b>       | <b>11</b>         | <b>-</b>         | <b>8</b>          | <b>19</b>         |

Source : EADA of Agriculture, Swat District

TABLE C-31 ESTIMATED LIVESTOCK POPULATION (1988)

(unit: '000 head)

| Animal                                       | No. of Households |                |                    | No. of Raised Animals |                |                    |                                 | No of Animals per Raised Household |
|--|-------------------|----------------|--------------------|-----------------------|----------------|--------------------|---------------------------------|------------------------------------|
|  | Total             | Farm Household | Non-Farm Household | Total                 | Farm Household | Non-Farm Household | Migratory Animals <sup>3/</sup> |                                    |
| 1. No. of Households with Animals            |                   |                |                    |                       |                |                    |                                 |                                    |
| (1) Cattle                                   | 146.4             | 114.7 (82.0)   | 31.7 (77.9)        | 580.2                 | 458.7          | 102.2              | 19.3                            | 4.0                                |
| - Bull/Bullock <sup>2/</sup>                 | N.A               | N.A            | N.A                | 155.5                 | 146.1          | 7.9                | 1.5                             | 1.3                                |
| - Cow <sup>2/</sup>                          | N.A               | N.A            | N.A                | 226.0                 | 166.0          | 50.5               | 9.5                             | 1.5                                |
| (2) Buffaloes                                | 91.0              | 78.5 (56.1)    | 12.5 (30.7)        | 270.3                 | 229.6          | 33.3               | 7.4                             | 2.9                                |
| - Bull/Bullock <sup>2/</sup>                 | N.A               | N.A            | N.A                | 8.5                   | 7.3            | 1.0                | 0.2                             | 0.1                                |
| - Cow <sup>2/</sup>                          | N.A               | N.A            | N.A                | 162.1                 | 142.9          | 15.7               | 3.5                             | 1.8                                |
| (3) Mules/Donkey                             | 19.3              | 12.1 (8.6)     | 17.1 (42.0)        | 36.1                  | 18.6           | 17.4               | 1.9                             | 1.5                                |
| (4) Sheep                                    | 13.6              | 10.8 (7.7)     | 2.8 (6.9)          | 226.9                 | 85.7           | 22.5               | 118.7                           | 7.9                                |
| (5) Goats                                    | 46.9              | 33.3 (23.8)    | 13.6 (33.4)        | 437.5                 | 210.4          | 60.5               | 166.6                           | 6.3                                |
| (6) Poultry                                  | 171.2             | 112.7 (80.6)   | 58.5 (143.7)       | 2,194.6               | 1,401.8        | 792.8              | N.A                             | 12.4                               |
| 2. No of Households with and without Animals | 180.6             | 139.9 (100.0)  | 40.7 (100.0)       |                       |                |                    |                                 |                                    |

Note: 1/ The figures in the parenthesis shows the percent of farm households with animals

2/ 3 years and above

3/ According to 1986 census of livestock Report on Survey of Migratory Herds, the total number of herd/flock are about 4000.

TABLE C-32 NUMBER OF VETERINARY FACILITIES

| Particulars                             | Swat Sub-Division |              | Shangla Par Sub-Division |              | Buner Sub-Division |              | Total    |              |
|---|-------------------|--------------|--------------------------|--------------|--------------------|--------------|----------|--------------|
|   | Location          | No. of Staff | Location                 | No. of Staff | Location           | No. of Staff | Location | No. of Staff |
| 1. Veterinary Hospital                  | 9                 | 55           | 0                        | 0            | 1                  | 5            | 1/ 10    | 60           |
| 2. Veterinary Dispensary                | 11                | 33           | 4                        | 12           | 6                  | 18           | 2/ 21    | 63           |
| 3. Veterinary Center                    | 3                 | 9            | 1                        | 3            | 3                  | 11           | 7        | 23           |
| 4. No Cost Basis Dispensary             |                   |              |                          | N.A.         |                    |              |          | 2            |
| 5. Mobile Veterinary Post               |                   |              |                          | N.A.         |                    |              |          | 10           |
| 6. Artificial Insemination(A.I.) Center | 1                 | 2            | 0                        | 0            | 0                  | 0            | 3/ 1     | 2            |
| 7. A.I. Sub-center                      | 7                 | 7            | 1                        | 1            | 1                  | 1            | 4/ 9     | 9            |

Source: Livestock and Poultry Office, Swat District and Artificial Insemination Office, Swat District

Notes : 1/ Swat Sub-Division --- Saidu Sharif, Matta, Kabal, Khwazakhela, Barikot, Madyan Chuprial, Sakhra and Charbagh

Buner Sub-Division -- Daggar

2/ Swat Sub-Division --- Shahderai, Dewlai, Daridial, Gwalelai, Shawar, Tindodeg Taghma, Qalagoy, Tall, Bandar and Kalam

Shangla Par Sub-Division -- Liloni, Chakesar, Puran and Martung

3/ Saidu Sharif

4/ Swat Sub-Division --- Barikot, Kabal, Dellai, Koza Bandai, Matta, Khwaza Khela and Madyan

Shangla Par Sub-Division -- Liloni

TABLE C-33 ANNUAL NUTRIENT REQUIREMENT

| Animal       | No. of<br>Cow Unit<br>( <sup>'000</sup> ) | Annual Nutrient Requirement                           |   |   |
|--------------|---|---|---|---|
|              |   | Dry<br>Matter <sup>1/</sup><br>( <sup>'000</sup> ton) | TDN <sup>2/</sup><br>( <sup>'000</sup> ton) | DCP <sup>3/</sup><br>( <sup>'000</sup> ton) |
| 1. Cattle    | 224.3                                     | 499   | 222   | 20  |
| - Adult      | 192.3                                     | 428   | 190   | 17  |
| - Young      | 32.0                                      | 71  | 32  | 3   |
| 2. Buffaloes | 207.5                                     | 462   | 204   | 18  |
| - Adult      | 186.8                                     | 416   | 184   | 16  |
| - Young      | 20.7                                      | 46  | 20  | 2   |
| 3. Sheep     | 24.4                                      | 54  | 24  | 2   |
| 4. Goats     | 79.8                                      | 178   | 78  | 7   |
| 5. Poultry   | 25.7                                      | 57  | 25  | 2   |
| Total        | 561.7                                     | 1,250   | 553   | 49  |

Notes: Annual requirement per head are assumed as follows:

$$\underline{1/} \quad 6.1 \text{ kg/day} \times 365 \text{ days} = 2,226 \text{ kg}$$

$$\underline{2/} \quad 2.7 \text{ kg/day} \times 365 \text{ days} = 986 \text{ kg}$$

$$\underline{3/} \quad 0.24 \text{ kg/day} \times 365 \text{ days} = 88 \text{ kg}$$



TABLE C-34 FISH PRODUCTION

| Year    | N.W.F.P.           |                    | Swat District      |                    |
|---------|--------------------|--------------------|--------------------|--------------------|
|         | Production<br>(kg) | Value<br>(lac. Rs) | Production<br>(kg) | Value<br>(lac. Rs) |
| 1970/71 | 150,000            | 5.0                | 3,075              | 0.10               |
| 71/72   | 135,000            | 6.0                | 8,050              | 0.36               |
| 72/73   | 210,000            | 10.40              | 23,150             | 1.14               |
| 73/74   | 121,000            | 7.20               | 11,050             | 0.66               |
| 74/75   | 140,000            | 9.80               | 9,900              | 0.69               |
| 75/76   | 243,000            | 17.10              | 1,900              | 0.13               |
| 76/77   | 273,910            | 19.17              | 5,340              | 0.37               |
| 77/78   | 413,790            | 26.86              | 12,240             | 0.86               |
| 78/79   | 471,709            | 33.57              | 14,500             | 1.02               |
| 79/80   | 692,542            | 69.10              | 13,020             | 1.55               |
| 80/81   | 481,102            | 47.17              | 35,112             | 3.32               |
| 81/82   | 500,000            | 50.00              | 25,000             | 2.50               |
| 82/83   | 709,000            | 70.90              | 15,000             | 1.50               |
| 83/84   | 642,271            | 64.21              | -                  | -                  |
| 84/85   | 700,000            | 146.20             | 27,000             | 8.10               |
| 85/86   | 702,500            | 71.60              | 45,000             | 4.50               |

Source: Fisheries Dept., N.W.F.P.

TABLE C-35 PROPOSED CROPPING PATTERN AND INTENSITY

(Unit: %)

| Crop  | Swat<br>Sub-Division | Shangla Par<br>Sub-Division | Buner<br>Sub-Division |
|---|----------------------|-----------------------------|-----------------------|
| <b>1. Pattern A (Reservoir Irrigation)</b>            |                      |                             |                       |
| <u>Kharif</u>   |                      |                             |                       |
| (1) Maize   | 30                   | 20                          | 40                    |
| (2) Rice  | 30                   | 50                          | -                     |
| (3) Potato  | -                    | -                           | -                     |
| (4) Sugarcane   | -                    | -                           | 20                    |
| (5) Fodders   | -                    | -                           | -                     |
| (6) Vegetables  | 20                   | 10                          | 20                    |
| (7) Fruits  | 20                   | 20                          | 20                    |
| <u>Sub-Total</u>                                      | <u>100.0</u>         | <u>100.0</u>                | <u>100.0</u>          |
| <u>Rabi</u>   |                      |                             |                       |
| (1) Wheat   | 30                   | 40                          | 30                    |
| (2) Onion   | 20                   | 20                          | -                     |
| (3) Sugarcane   | -                    | -                           | 20                    |
| (4) Fodders   | 10                   | 10                          | 10                    |
| (5) Vegetables  | 20                   | 10                          | 20                    |
| (6) Fruits  | 20                   | 20                          | 20                    |
| <u>Sub-Total</u>                                      | <u>100.0</u>         | <u>100.0</u>                | <u>100.0</u>          |
| <u>Total</u>  | <u>200.0</u>         | <u>200.0</u>                | <u>200.0</u>          |
| <b>2. Pattern B (Improved Traditional Irrigation)</b> |                      |                             |                       |
| <u>Kharif</u>   |                      |                             |                       |
| Rice  | 100                  | 100                         | 100                   |
| <u>Rabi</u>   |                      |                             |                       |
| Wheat   | 100                  | 100                         | 100                   |
| <u>Total</u>  | <u>200</u>           | <u>200</u>                  | <u>200</u>            |

TABLE C-36 TARGET YIELD (BARANI TO BARANI)

| Crop                   | P &<br>W/OP | W/P  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
|------------------------|-------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
|                        |             | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20   |
| <b>Kharif Crops</b>    |             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1. Maize               | 1.1         | 1.2  | 1.2  | 1.2  | 1.3  | 1.3  | 1.3  | 1.3  | 1.3  | 1.3  | 1.3  | 1.3  | 1.3  | 1.4  | 1.4  | 1.4  | 1.4  | 1.4  | 1.4  | 1.4  | 1.4  |
| 2. Rice                | -           | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| 3. Pulses              | 0.6         | 0.6  | 0.7  | 0.7  | 0.8  | 0.8  | 0.9  | 0.9  | 0.9  | 0.9  | 0.9  | 0.9  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  |
| 4. Potato              | 6.9         | 6.9  | 6.9  | 7.0  | 7.2  | 7.2  | 7.5  | 7.5  | 7.5  | 7.7  | 7.7  | 7.8  | 7.8  | 7.9  | 7.9  | 7.9  | 8.0  | 8.0  | 8.0  | 8.0  | 8.0  |
| 5. Vegetables          | -           | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| 6. Sugarcane           | 21.8        | 21.9 | 21.9 | 22.5 | 23.0 | 23.0 | 23.5 | 23.5 | 24.0 | 24.0 | 24.0 | 24.5 | 25.0 | 25.0 | 25.5 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 | 26.0 |
| 7. Fruits<br>(Apple)   | -           | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| 8. Fooders &<br>Others | -           | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| <b>Rabi Crops</b>      |             |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| 1. Wheat               | 0.8         | 0.8  | 0.8  | 0.8  | 0.8  | 0.8  | 0.8  | 0.9  | 0.9  | 0.9  | 0.9  | 0.9  | 0.9  | 0.9  | 0.9  | 0.9  | 0.9  | 0.9  | 0.9  | 0.9  | 0.9  |
| 2. Rape &<br>Mustard   | 0.4         | 0.4  | 0.4  | 0.4  | 0.4  | 0.4  | 0.4  | 0.5  | 0.5  | 0.5  | 0.5  | 0.5  | 0.5  | 0.5  | 0.5  | 0.5  | 0.5  | 0.5  | 0.5  | 0.5  | 0.5  |
| 3. Pulses              | 0.7         | 0.7  | 0.7  | 0.8  | 0.8  | 0.8  | 0.8  | 0.9  | 0.9  | 0.9  | 0.9  | 0.9  | 0.9  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  |
| 4. Onion               | 7.3         | 7.5  | 7.5  | 7.8  | 8.0  | 8.0  | 8.2  | 8.2  | 8.2  | 8.4  | 8.4  | 8.4  | 8.6  | 8.6  | 8.8  | 8.8  | 8.9  | 8.9  | 8.9  | 8.9  | 8.9  |
| 5. Vegetables          | -           | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| 6. Fooders             | -           | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |

TABLE C-37 TARGET YIELD (BARANI TO IRRIGATED)

| Crop                | P & W/OP | W/P  |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |            |
|---------------------|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------------|
|                     |          | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20         |
| <u>Kharif Crops</u> |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |            |
| 1. Maize            | 1.0      | 1.3  | 1.5  | 1.7  | 2.0  | 2.2  | 2.3  | 2.4  | 2.5  | 2.5  | 2.6  | 2.7  | 2.7  | 2.8  | 2.8  | 2.9  |      |      |      |      |            |
| 2. Rice             | 0.6      | 1.6  | 1.8  | 2.0  | 2.4  | 2.6  | 2.8  | 3.0  | 3.2  | 3.4  | 3.5  | 3.6  | 3.7  | 3.8  | 3.9  | 4.0  |      |      |      |      |            |
| 3. Pulses           | 0.6      | 0.6  | 0.7  | 0.7  | 0.8  | 0.8  | 0.9  | 0.9  | 0.9  | 1.0  | 1.0  | 1.1  | 1.1  | 1.1  | 1.1  | 1.2  |      |      |      |      | Black Gram |
| 4. Potato           | 6.9      | 7.7  | 8.7  | 10.1 | 11.3 | 12.0 | 12.5 | 13.0 | 13.5 | 13.5 | 14.0 | 14.0 | 14.5 | 14.5 | 14.5 | 15.0 |      |      |      |      |            |
| 5. Vegetables       | -        | 5.0  | 6.5  | 8.5  | 10.5 | 12.0 | 12.5 | 12.5 | 13.0 | 13.0 | 13.0 | 13.0 | 13.5 | 13.5 | 13.5 | 14.0 |      |      |      |      | Tomato     |
| 6. Sugarcane        | 12.8     | 25.0 | 28.0 | 32.0 | 36.0 | 38.5 | 39.5 | 40.0 | 40.0 | 40.5 | 40.5 | 41.0 | 41.5 | 41.5 | 41.5 | 42.0 |      |      |      |      |            |
| 7. Fruits           | -        | -    | -    | -    | -    | -    | 3.0  | 5.0  | 7.0  | 9.0  | 11.0 | 12.0 | 13.0 | 13.5 | 14.0 | 14.0 | 14.0 | 14.5 | 14.5 | 15.0 | Apple      |
| 8. Fodders          | -        | 11.0 | 15.0 | 17.0 | 19.0 | 19.0 | 20.5 | 21.5 | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    | Maize      |
| <u>Rabi Crops</u>   |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |            |
| 1. Wheat            | 0.8      | 0.9  | 1.2  | 1.7  | 2.2  | 2.5  | 2.7  | 2.9  | 3.0  | 3.1  | 3.2  | 3.3  | 3.4  | 3.5  | 3.5  | 3.6  |      |      |      |      |            |
| 2. Rape & Mustard   | 0.4      | 0.4  | 0.5  | 0.5  | 0.6  | 0.6  | 0.7  | 0.8  | 0.8  | 0.8  | 0.8  | 0.9  | 0.9  | 0.9  | 0.9  | 1.0  |      |      |      |      |            |
| 3. Pulses           | 0.7      | 0.8  | 0.8  | 0.9  | 0.9  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.1  | 1.1  | 1.1  | 1.1  | 1.2  |      |      |      |      | Lentil     |
| 4. Onion            | 7.3      | 8.0  | 9.5  | 12.0 | 14.5 | 15.5 | 16.5 | 16.5 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.5 | 17.5 | 18.0 |      |      |      |      |            |
| 5. Vegetables       | -        | 4.0  | 6.0  | 8.0  | 9.0  | 9.5  | 10.0 | 10.5 | 11.0 | 11.0 | 11.0 | 11.5 | 11.5 | 11.5 | 11.5 | 12.0 |      |      |      |      |            |
| 6. Fodders          | -        | 8.0  | 10.0 | 14.0 | 19.0 | 21.0 | 23.0 | 24.0 | 24.5 | 24.5 | 24.5 | 25.0 | 25.0 | 25.5 | 25.5 | 26.0 |      |      |      |      | Shaftal    |

TABLE C-38 TARGET YIELD (IRRIGATED TO IRRIGATED)

| Crop                        | W/P   |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |             |
|-----------------------------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------------|
|                             | 1     | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15   | 16   | 17   | 18   | 19   | 20          |
| <u>Kharif Crops</u>         |       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |             |
| 1. Maize                    | 1.8   | 1.8  | 1.9  | 2.0  | 2.1  | 2.2  | 2.3  | 2.4  | 2.5  | 2.5  | 2.6  | 2.7  | 2.7  | 2.8  | 2.8  | 2.9  |      |      |      |             |
| 2. Rice                     | 1.6   | 1.8  | 2.0  | 2.2  | 2.4  | 2.6  | 2.8  | 3.0  | 3.2  | 3.4  | 3.5  | 3.6  | 3.7  | 3.8  | 3.9  | 4.0  |      |      |      |             |
| 3. Pulses                   | 0.8   | 0.9  | 0.9  | 0.9  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.1  | 1.1  | 1.1  | 1.1  | 1.2  |      |      |      | Black Gram  |
| 4. Potato                   | 11.2  | 11.3 | 11.4 | 11.5 | 11.5 | 12.0 | 12.5 | 13.0 | 13.5 | 13.5 | 14.0 | 14.0 | 14.5 | 14.5 | 14.5 | 15.0 |      |      |      | Tomato      |
| 5. Vegetables               | 11.7  | 11.8 | 11.8 | 12.0 | 12.0 | 12.5 | 12.5 | 13.0 | 13.0 | 13.0 | 13.0 | 13.5 | 13.5 | 13.5 | 14.0 |      |      |      |      |             |
| 6. Sugarcane                | 38.0  | 38.5 | 39.0 | 39.0 | 39.5 | 39.5 | 40.0 | 40.0 | 40.5 | 40.5 | 41.0 | 41.5 | 41.5 | 41.5 | 42.0 |      |      |      |      |             |
| 7. Fruits                   | -     | -    | -    | -    | 3.0  | 5.0  | 7.0  | 9.0  | 11.0 | 12.0 | 13.0 | 13.5 | 13.5 | 14.0 | 14.0 | 14.0 | 14.5 | 14.5 | 15.0 | Apple       |
| 8. Fodders                  | 18.6  | 19.0 | 19.5 | 20.0 | 20.5 | 21.0 | 21.5 | 22.0 | 22.5 | 23.0 | 23.5 | 24.0 | 24.0 | 24.5 | 24.5 | 25.0 |      |      |      | Maize       |
| <u>Rabi Crops</u>           |       |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |             |
| 1. Wheat                    | 1.6   | 1.7  | 1.8  | 2.0  | 2.2  | 2.5  | 2.7  | 2.9  | 3.0  | 3.1  | 3.2  | 3.3  | 3.4  | 3.5  | 3.5  | 3.6  |      |      |      |             |
| 2. Rape & Mustard           | 0.6   | 0.6  | 0.6  | 0.7  | 0.7  | 0.7  | 0.7  | 0.8  | 0.8  | 0.8  | 0.8  | 0.9  | 0.9  | 0.9  | 0.9  | 1.0  |      |      |      |             |
| 3. Pulses                   | 1.0   | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.0  | 1.1  | 1.1  | 1.1  | 1.1  | 1.2  |      |      |      | Lentil      |
| 4. Onion                    | 16.01 | 16.0 | 16.0 | 16.5 | 16.5 | 16.5 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.0 | 17.5 | 17.5 | 17.5 | 18.0 |      |      |      |             |
| 5. Vegetables (Cauliflower) | 9.0   | 9.5  | 9.5  | 10.0 | 10.0 | 10.5 | 10.5 | 10.5 | 11.0 | 11.0 | 11.0 | 11.0 | 11.5 | 11.5 | 11.5 | 12.0 |      |      |      | Cauliflower |
| 6. Fodders                  | 18.9  | 19.0 | 20.0 | 21.0 | 22.0 | 23.0 | 24.0 | 24.0 | 24.5 | 24.5 | 24.5 | 25.0 | 25.0 | 25.5 | 25.5 | 26.0 |      |      |      | Shaftal     |

TABLE C-39 QUANTITY OF AGRICULTURAL SUPPORTING FACILITIES

| Facility/No. of Staff            | Size of Bld'g<br>Bld'g Residence<br>(m <sup>2</sup> ) | Equipment                      | No. |
|----------------------------------|---|--------------------------------|-----|
| 1. Research                      |   |                                |     |
| 1.1. Kalam Substation of Mingora | 200   | 1. Analytical Equipments       | L.S |
| Agricultural Research Station    | 200   | 2. Tools                       | L.S |
| - Researchers 5                  |   | 3. Farm Machinery              |     |
| - Other Staff 5                  |   | - Tractor (20 - 30HP)          | 1   |
| <u>Total 10</u>                  |   | - Power Tiller (5-10HP)        | 2   |
|                                  |   | - Plot Planter                 | 1   |
|                                  |   | - Sprayer                      | 2   |
|                                  |   | - Cultivator                   | 1   |
|                                  |   | 4. Bicycles                    |     |
|                                  |   | - Pick-up                      | 1   |
|                                  |   | - Motorcycle                   | 3   |
|                                  |   | 5. Audio-visual Aids & Others  | L.S |
| 1.2. Upgradation of Mingora      | 300   | 1. Analytical Equipment        | L.S |
| Agricultural Research Station    | 1,500   | 2. Furniture/Office Equipments | L.S |
| to Research Institute            |   | 3. Bicycles                    |     |
| - Researchers 9                  |   | - Minibus                      | 1   |
| - Others 6                       |   | - Jeep                         | 2   |
| <u>Total 15</u>                  |   | - Pick-up                      | 2   |
| (Additional Staff)               |   |                                |     |

| Facility/No. of Staff                    | Size of Bld'g                        |                   | Equipment   | No.   |
|--|--------------------------------------|-------------------|---|---|
|  | Bld'g Residence<br>(m <sup>2</sup> ) | (m <sup>2</sup> ) |   |   |
| 2. Extension and Seed Multiplication     |                                      |                   |   |   |
| 2.1. ATTD Farm                           | 2,420                                | 1,100             | 1. Analytical Equipments<br>2. Tools<br>3. Farm Machinery<br>4. Workshop Equipments<br>5. Bicycles<br>6. Audio-visual Aids and<br>7. Others | L.S<br>L.S<br>L.S<br>L.S<br>L.S<br>L.S<br>L.S |
| - Subject Matter Specialists/Researchers | 7                                    |                   |   |   |
| - Others                                 | 23                                   |                   |   |   |
| <u>Total</u>                             | <u>30</u>                            |                   |   |   |
| 2.2. Agricultural Training Center        |                                      |                   | 1. Furniture/Office Equipments<br>2. Audio-visual Equipments<br>3. Bicycles<br>- Pick-up  | L.S<br>L.S<br>1                               |
| - Agriculture Officer                    | 1                                    |                   |   |   |
| - Other Staff                            | 3                                    |                   |   |   |
| <u>Total</u>                             | <u>4</u>                             |                   |   |   |
| 2.3. Agricultural Training Subcenter     |                                      |                   | 1. Furniture/Office Equipments<br>2. Audio-visual Equipments<br>3. Motorcycle   | L.S<br>L.S<br>1                               |
| - Field Assistant                        | 1                                    |                   |   |   |
| - Other Staff                            | 2                                    |                   |   |   |
| <u>Total</u>                             | <u>3</u>                             |                   |   |   |
| 2.4. Seed Farm                           |                                      |                   | 1. Farm Machinery<br>- Tractor & Attachments<br>- Thresher<br>- Seed Cleaner<br>- Dryer<br>- Storage Bin<br>2. Bicycle<br>- Pick-up         | 1<br>1<br>1<br>1<br>1<br>1<br>1               |
| - Agriculture Officer                    | 1                                    |                   |   |   |
| - Field Assistant                        | 2                                    |                   |   |   |
| - Other Staff                            | 7                                    |                   |   |   |
| <u>Total</u>                             | <u>11</u>                            |                   |   |   |
| 2.5. Nursery Station                     | 60                                   |                   | 1. Farm Machinery<br>- Tractor & Attachments<br>- Tools & Implements<br>2. Bicycle<br>- Pick-up   | 1<br>1<br>1<br>1                              |
| - Field Assistant                        | 1                                    |                   |   |   |
| - Budder                                 | 1                                    |                   |   |   |
| - Other Staff                            | 2                                    |                   |   |   |
| <u>Total</u>                             | <u>4</u>                             |                   |   |   |

| Facility/No. of Staff           | Size of Bld'g<br>Bld'g Residence<br>(m <sup>2</sup> ) | Equipment                              | No. |
|---------------------------------|---|--|-----|
| 2.6. Fruits & Vegetables        | 100   |  |     |
| - District Officer              | 1   | 1. Furniture/Office Equipments         | L.S |
| - Other Staff                   | 4   | 2. Audio-visual Aids                   | L.S |
| <u>Total</u>                    | <u>5</u>  | 3. Farm MACHINERY                      |     |
|                                 |   | - Sprayer                              | 1   |
|                                 |   | - Gardening Power Tiller               | 10  |
|                                 |   | - Grass Cutter                         | 10  |
|                                 |   | - Water Lifter                         | 10  |
|                                 |   | - Small Tractor                        | 3   |
|                                 |   | 4. Tools and Others                    | L.S |
| 2.7. Fruits & Vegetables        | 90  |  |     |
| Training Center                 |   | 1. Furniture/Office Equipments         | L.S |
| - Field Assistant               | 1   | 2. Farm Machinery                      |     |
| - Other Staff                   | 2   | - Sprayer                              | 1   |
| <u>Total</u>                    | <u>3</u>  | 3. Tools                               | L.S |
|                                 |   | 4. Motorcycle                          | 1   |
| 2.8. Bee-Keeping Center         | 90  |  |     |
| - Technical Staff               | 4   | 1. Colony Box                          | L.S |
| - Other Staff                   | 2   | 2. Prodders                            | L.S |
| <u>Total</u>                    | <u>6</u>  | 3. Honey Extractor                     | 1   |
|                                 |   | 4. Bicycle                             |     |
|                                 |   | - Small Sized Jeep                     | 1   |
|                                 |   | - Motorcycle                           | 1   |
| 3. Animal Husbandry Development |   |  |     |
| 3.1. Veterinary Hospital        | 110   |  |     |
| - Veterinary Officer            | 1   | 1. Dystokia Kit                        | 1   |
| - Stock Assistant               | 1   | 2. Emergence Kit                       | 1   |
| - Other Staff                   | 3   | 3. Pest Morten Kit                     | 1   |
| <u>Total</u>                    | <u>5</u>  | 4. Artern Forea & Dressing             | L.S |
|                                 |   | 5. Refrigerator (Kerosion/Electricity) | 2   |
|                                 |   | 6. Bicycle                             |     |
|                                 |   | - Pick-up                              | 1   |



| Facility/No. of Staff                  | Size of Bld'g                        |                                | Equipment                    | No. |
|--|--------------------------------------|--------------------------------|------------------------------|-----|
|  | Bld'g Residence<br>(m <sup>2</sup> ) | Residence<br>(m <sup>2</sup> ) |                              |     |
| 3.2. Natural Breeding Center           | 150                                  | -                              | 1. Stud Bull                 | 1   |
| - Bull Attendant                       |                                      |                                | 2. Gear Article              | L.S |
|  |                                      |                                | 3. Others                    | L.S |
|  |                                      |                                | Total                        |     |
| 3.3. Artificial Insemination Center    | 200                                  | 100                            | 1. Liquid Nitrogen Container | 1   |
| - Veterinary Officer                   |                                      |                                | 2. Microscope                | 1   |
| - Inseminator                          |                                      |                                | 3. Injector & Others         | L.S |
| - Cattle Attendant                     |                                      |                                | 4. Motorcycle                | 2   |
| <u>Total</u>                           |                                      |                                |                              |     |
| 3.4. Artificial Insemination Subcenter | 150                                  | 80                             | 1. Liquid Nitrogen Container | 1   |
| - Inseminator                          |                                      |                                | 2. Microscope                | 1   |
| - Cattle Attendant                     |                                      |                                | 3. Injector & Others         | L.S |
| <u>Total</u>                           |                                      |                                | 4. Motorcycle                | 1   |
| 3.5. Animal Nutrition Center           | 130                                  | 80                             | 1. Scale and Measures        | L.S |
| - Veterinary Officer                   |                                      |                                | 2. Motorcycle                | 1   |
| - Production Assistant                 |                                      |                                |                              |     |
| - Other Staff                          |                                      |                                |                              |     |
| <u>Total</u>                           |                                      |                                |                              |     |
| 3.6. Poultry Hatchery                  | 1,000                                | 220                            | 1. Brooder                   | 8   |
| - Manager                              |                                      |                                | 2. Drinker (Large/Small)     | 2   |
| - Attendant                            |                                      |                                | 3. Feeder                    | 4   |
| <u>Total</u>                           |                                      |                                | 4. Generator and Others      | L.S |

| Facility/No. of Staff            | Size of Bld'g<br>Bid'g Residence<br>(m <sup>2</sup> ) | (m <sup>2</sup> ) | Equipment                      | No. |
|----------------------------------|---|-------------------|--------------------------------|-----|
| 4. Soil Conservation             |   |                   |                                |     |
| 4.1. Soil Conservation Project   | 500   | 300               | 1. Equipments                  |     |
| - Technical staff                |   |                   | - Dozer (90HP)                 | 12  |
| - Operators & Others             | 107   |                   | - Tractor (45 HP)              | 6   |
| <u>Total</u>                     | <u>111</u>  |                   | 2. Bicycle                     |     |
| (Additional staff)               |   |                   | - Jeep                         | 1   |
|                                  |   |                   | - Pick-up                      | 2   |
|                                  |   |                   | - Small Jeep                   | 2   |
|                                  |   |                   | 3. Workshop Equipments         | L.S |
|                                  |   |                   | 4. Furniture/Office Equipments | L.S |
| 5. Agricultural Engineering      | 50  | -                 | Farm Machinery                 |     |
| 5.1.                             |   |                   | - Tractor (30-50HP)            | 5   |
| - Unit Supervisor                | 1   |                   | - Tractor (20-30HP)            | 5   |
| - Junior Store Keeper            | 1   |                   | - Power Tiller (10HP)          | 10  |
| - Mechanics                      | 1   |                   | - Sprayer (3HP)                | 10  |
| - Welder                         | 1   |                   |                                |     |
| - Black-smith                    | 1   |                   |                                |     |
| - Other Staff                    | 1   |                   |                                |     |
| <u>Total</u>                     | <u>6</u>  |                   |                                |     |
| 6. Cooperatives and Input Supply |   |                   |                                |     |
| 6.1. Inspector Office            | 80  | 100               | 1. Furniture/Office Equipments | L.S |
| - Inspector                      | 1   |                   | 2. Motorcycle                  | 3   |
| - Sub-inspector                  | 2   |                   |                                |     |
| - Others                         | 6   |                   |                                |     |
| <u>Total</u>                     | <u>9</u>  |                   |                                |     |

| Facility/No. of Staff          | Size of Bld'g & Residence |                   | Equipment                        | No. |
|--------------------------------|---------------------------|-------------------|----------------------------------|-----|
|                                | (m <sup>2</sup> )         | (m <sup>2</sup> ) |                                  |     |
| 6.2. Cooperative Bank          | 80                        | 100               | 1. Furniture/Office Equipments   | L.S |
| - Manager                      | 1                         |                   | 2. Motorcycle                    | 2   |
| - Sub-Manager                  | 2                         |                   |                                  |     |
| - Other Staff                  | 6                         |                   |                                  |     |
| <u>Total</u>                   | <u>9</u>                  |                   |                                  |     |
| 6.3. ADA Sale Point            | 200                       | -                 | 1. Furniture/Office Equipments   | L.S |
| - Sale Staff                   | 2                         |                   |                                  |     |
| 7. Small Industry              |                           |                   |                                  |     |
| 7.1. Fruit Processing Factory  | 400                       | 100               | 1. Processing Plant & Equipments | L.S |
| - Management Staff             | 5                         |                   | 2. Bicycle                       |     |
| - Workers                      | 15                        |                   | - Truck (5 ton)                  | 1   |
| <u>Total</u>                   | <u>20</u>                 |                   | - Truck 2 ton)                   | 1   |
|                                |                           |                   | - Pick-up                        | 1   |
|                                |                           |                   | 3. Furniture/Equipments          | L.S |
| 7.2. Woodcraft Training Center | 300                       | 150               | 1. Processing Equipments         | L.S |
| - Training Staff               | 5                         |                   | 2. Furniture Office Equipments   | L.S |
| - Other Staff                  | 5                         |                   | 3. Bicycle                       |     |
| <u>Total</u>                   | <u>10</u>                 |                   | - Minibus                        | 1   |
|                                |                           |                   | - Pick-up                        | 1   |
|                                |                           |                   | 4. Audio-visual Aids             | L.S |
| 7.3. Gabion Factory            | 300                       | 150               | 1. Gabion Making Plant           | L.S |
| - Management Staff             | 5                         |                   | 2. Furniture/Office Equipments   | L.S |
| - Other Staff                  | 5                         |                   | 3. Bicycle                       |     |
| <u>Total</u>                   | <u>10</u>                 |                   | - Truck (5 ton)                  | 1   |
|                                |                           |                   | - Pick-up                        | 1   |
| 7.4. Women Handicraft          | 300                       | 100               | 1. Handicraft Equipments         |     |
| Inspector's Office and         |                           |                   | - Sewing Machines                | 20  |
| Women Handicraft Center        |                           |                   | - Knitting Computer Machines     | 5   |
|                                |                           |                   | - Disc-matic Machines            | 10  |
|                                |                           |                   | 2. Furniture/Office Equipments   | L.S |
|                                |                           |                   | 3. Bicycle                       |     |
|                                |                           |                   | - Pick-up                        | 1   |

TABLE C-60 PROPOSED AGRICULTURAL SUPPORTING FACILITIES BY TERM OF PLAN

| Facilities  | Target              | Unit     |       |   | Swat  |        |      | Shaigla Par |        |      | Buner |        |      | District Total |        |      |
|---|---------------------|----------|-------|---|-------|--------|------|-------------|--------|------|-------|--------|------|----------------|--------|------|
|   |                     | District | Place | " | Short | Middle | Long | Short       | Middle | Long | Short | Middle | Long | Short          | Middle | Long |
| 1. Research   |                     |          |       |   |       |        |      |             |        |      |       |        |      |                |        |      |
| 1.1 Kalam Substation of the Mingora Station                         | District            |          | 1     |   |       |        |      |             |        |      |       |        |      |                |        | 1    |
| 1.2 Agricultural Research Institute (Mingora)                       | District            |          |       |   | 1     |        |      |             |        |      |       |        |      |                |        | 1    |
| 2. Extension and Seed Production                                    |                     |          |       |   |       |        |      |             |        |      |       |        |      |                |        |      |
| 2.1 ATTD Farm (Main)  | District            |          | 1     |   |       |        |      |             |        |      |       |        |      |                |        | 1    |
| 2.2 ATTD Farm (Branch)  | "                   |          | 1     |   | 4     |        |      |             |        |      |       |        |      |                |        | 1    |
| 2.3 Agricultural Training Center                                    | Every 3 to 5 UCS    |          | 2     |   | 2     | 6      |      | 2           | 3      |      |       |        |      |                | 5      | 6    |
| 2.4 Agricultural Training Subcenter                                 | All UCS             |          | 10    |   | 14    | 14     |      | 6           | 3      | 4    |       |        |      |                | 17     | 18   |
| 2.5 Seed Farm   | All Sub-Divisions   |          | 2     |   |       |        |      | 1           |        |      |       |        |      |                | 4      |      |
| 2.6 Nursery Station   | All Sub-Divisions   |          | 1     |   | 1     |        |      | 1           |        |      |       |        |      |                | 1      | 1    |
| 2.7 Fruits & Vegetable Training Center                              | District            |          | 1     |   |       |        |      | 1           |        |      |       |        |      |                | 1      |      |
| 2.8 Fruits & Vegetables Training Subcenter                          | All Sub-Divisions   |          | 4     |   |       |        |      | 1           |        |      | 2     |        |      |                | 6      | 2    |
| 2.9 Bee-Keeping Center  | All Sub-Divisions   |          | 1     |   | 1     |        |      | 1           |        |      | 1     |        |      |                | 1      | 1    |
| 3. Animal Husbandry Development                                     |                     |          |       |   |       |        |      |             |        |      |       |        |      |                |        |      |
| 3.1 Veterinary Hospital   | Every 3 to 5 UCS    |          | 1     |   |       |        |      | 4           | 1      |      |       |        |      |                | 4      | 1    |
| 3.2 Natural Breeding Center   | All Sub-Divisions   |          | 1     |   |       |        |      | 3           | 1      |      |       |        |      |                | 4      | 4    |
| 3.3 A.I. Center   | Every 3 to 5 UCS    |          | 1     |   |       |        |      | 1           |        |      |       |        |      |                | 2      |      |
| 3.4 A.I. Subcenter  | All Sub-Divisions   |          | 1     |   |       |        |      | 1           |        |      | 1     |        |      |                | 1      | 1    |
| 3.5 Animal Nutrition Center   | All Sub-Divisions   |          | 1     |   |       |        |      | 1           |        |      | 1     |        |      |                | 2      | 1    |
| 3.6 Poultry Hatchery  | All Sub-Divisions   |          | 1     |   | 1     |        |      | 1           |        |      | 1     |        |      |                | 1      | 1    |
| 4. Soil Conservation Project  | Throughout District |          |       |   |       |        |      |             |        |      |       |        |      |                | 1/3    | 1/3  |
| 5. Farm Mechanization   |                     |          |       |   |       |        |      |             |        |      |       |        |      |                |        |      |
| 5.1 Tractor Station   | "                   |          |       |   |       |        |      | 3           |        |      |       |        |      |                |        | 3    |
| 6. Cooperatives/Input Supply  |                     |          |       |   |       |        |      |             |        |      |       |        |      |                |        |      |
| 6.1 Cooperatives Inspector Office                                   | Every 3 to 5 UCS    |          | 1     |   |       |        |      | 1           | 2      |      |       |        |      |                | 1      | 1    |
| 6.2 Agricultural Cooperative Bank                                   | All Sub-Divisions   |          | 1     |   |       |        |      | 1           |        |      |       |        |      |                | 1      |      |
| 6.3 ADA Soil Point & Warehouse                                      | All Sub-Divisions   |          | 1     |   |       |        |      | 1           |        |      |       |        |      |                | 1      |      |
| 7. Marketing System   |                     |          |       |   |       |        |      |             |        |      |       |        |      |                |        |      |
| 7.1 Vegetable and Fruit Market                                      | "                   |          | 1     |   | 6     |        |      | 4           |        |      |       |        |      |                | 4      | 8    |
| 7.2 Computer System   | "                   |          | 1     |   |       |        |      |             |        |      |       |        |      |                | 1      |      |
| 8. Small Industry   |                     |          |       |   |       |        |      |             |        |      |       |        |      |                |        |      |
| 8.1 Women Handicraft Inspectress Office and Women Handicraft Center | All Sub-Divisions   |          | 1     |   |       |        |      | 1           |        |      |       |        |      |                | 1      |      |
| 8.2 Fruit Processing Industry                                       | "                   |          | 1     |   |       |        |      |             |        |      |       |        |      |                |        | 1    |
| 8.3 Woodcraft Center  | "                   |          |       |   |       |        |      |             |        |      |       |        |      |                |        |      |
| 8.4 Gabion Manufacture Factory                                      | "                   |          |       |   |       |        |      | 1           |        |      |       |        |      |                | 1      |      |

TABLE C-41 LOCATION OF AGRICULTURAL SUPPORTING FACILITIES (LONG TERM DEVELOPMENT PLAN)

| Subproject Area             | Research          |                       |                    |                  | Extension and Seed, Multiplication |                  |                   |              |                   |                       | Animal Husbandry   |                     |                         |            | Soil           |                         | Cooperatives |                  |                   |
|-----------------------------|-------------------|-----------------------|--------------------|------------------|------------------------------------|------------------|-------------------|--------------|-------------------|-----------------------|--------------------|---------------------|-------------------------|------------|----------------|-------------------------|--------------|------------------|-------------------|
|                             | Kalam Sub-station | Agri Institute (Main) | ATTD Farm (Branch) | ATTD Farm (Main) | Agri. Center                       | Agri. Sub-Center | Agri. Ext. Center | Seed Nursery | F & V Ext. Center | F & V Ext. Sub-Center | Bee-Keeping Center | Veterinary Hospital | Natural Breeding Center | A.1 Center | A.1 Sub-Center | Animal Nutrition Center |              | Poultry Hatchery | Inspection Office |
| 1. Sweet Sub-Division       | 1                 | 1                     | 1                  | 1                | 10                                 | 36               | 2                 | 1            | 4                 | 1                     | 4                  | 4                   | 4                       |            |                |                         |              |                  |                   |
| 1.1 Kalam                   |                   |                       |                    |                  | 1                                  | 2                |                   |              | 1                 |                       |                    |                     |                         |            |                |                         |              |                  |                   |
| 1.2 Bahrain                 |                   |                       |                    |                  | 1                                  | 4                |                   |              |                   |                       |                    |                     |                         |            |                |                         |              |                  |                   |
| 1.3 Matta/Shangvatat        |                   |                       |                    |                  | 2                                  | 8                | 1                 |              |                   | 1                     |                    |                     |                         |            |                |                         |              |                  |                   |
| 1.4 Kwarakheila             |                   |                       |                    |                  | 1                                  | 4                |                   |              |                   |                       |                    |                     |                         |            |                |                         |              |                  |                   |
| 1.5 Charbagh                |                   |                       | 1                  |                  | 1                                  | 3                |                   |              |                   |                       |                    |                     |                         |            |                |                         |              |                  |                   |
| 1.6 Kabal                   |                   |                       |                    |                  | 1                                  | 3                |                   |              |                   |                       |                    |                     |                         |            |                |                         |              |                  |                   |
| 1.7 Mingora                 |                   | 1                     |                    |                  | 1                                  | 6                |                   |              |                   |                       |                    |                     |                         |            |                |                         |              |                  |                   |
| 1.8 Kanju                   |                   |                       |                    |                  | 1                                  | 3                |                   |              |                   |                       |                    |                     |                         |            |                |                         |              |                  |                   |
| 1.9 Berikot                 |                   |                       |                    |                  | 1                                  | 3                |                   |              |                   |                       |                    |                     |                         |            |                |                         |              |                  |                   |
| 2. Shaugla Par Sub-Division |                   |                       |                    |                  | 5                                  | 15               | 2                 | 1            | 1                 | 1                     | 1                  | 5                   | 4                       | 1          | 1              | 1                       | 1            |                  |                   |
| 2.1 Alpri                   |                   |                       |                    |                  | 1                                  | 7                | 1                 |              |                   |                       |                    | 1                   | 1                       | 1          | 1              |                         |              |                  |                   |
| 2.2 Puzan                   |                   |                       |                    |                  | 1                                  | 2                | 1                 |              |                   |                       |                    | 1                   | 1                       | 1          | 1              |                         |              |                  |                   |
| 2.3 Chakesar                |                   |                       |                    |                  | 1                                  | 2                |                   |              |                   |                       |                    | 2                   | 1                       | 1          | 1              |                         |              |                  |                   |
| 2.4 Martung                 |                   |                       |                    |                  | 1                                  | 2                |                   |              |                   |                       |                    | 1                   | 1                       | 1          | 1              |                         |              |                  |                   |
| 2.5 Besham                  |                   |                       |                    |                  | 1                                  | 2                |                   |              |                   |                       |                    | 1                   | 1                       | 1          | 1              |                         |              |                  |                   |
| 3. Buner Sub-Division       |                   |                       |                    |                  | 1                                  | 1                |                   | 1            | 1                 | 1                     | 5                  | 1                   | 1                       | 1          | 2              | 2                       | 2            |                  |                   |
| 3.1 Daggar                  |                   |                       |                    |                  |                                    |                  |                   | 1            | 1                 | 1                     | 1                  | 1                   | 1                       | 1          | 1              | 1                       |              |                  |                   |
| 3.2 Gadezai                 |                   |                       |                    |                  |                                    |                  |                   |              |                   |                       |                    |                     |                         |            |                |                         |              |                  |                   |
| 3.3 Gagra                   |                   |                       |                    |                  |                                    |                  |                   |              |                   |                       |                    |                     |                         |            |                |                         |              |                  |                   |
| 3.4 Chagarzai               |                   |                       |                    |                  | 1                                  | 1                |                   |              |                   |                       |                    |                     |                         |            |                |                         |              |                  |                   |
| 3.5 Chamla/Amazai           |                   |                       |                    |                  |                                    |                  |                   |              |                   |                       |                    |                     |                         |            |                |                         |              |                  |                   |
| 3.6 Khudkhel                |                   |                       |                    |                  |                                    |                  |                   |              |                   |                       |                    |                     |                         |            |                |                         |              |                  |                   |
| Total                       | 1                 | 1                     | 1                  | 1                | 15                                 | 52               | 4                 | 3            | 1                 | 10                    | 3                  | 6                   | 9                       | 2          | 3              | 3                       | 2            | 2                | 1                 |

Notes : The location of other Schemes are as follows:

- (1) Tractor Station: Short Term 3 (Chakesar, Puzan, and Martung)
- (2) ADA Sale Point : Short Term 1 (Alpuri)
- (3) Women Handicraft Inspector Office and Women Handicraft Center: Short Term 1 (Chakesar)
- (4) Fruit Processing Industry: Medium Term 1 (Mingora)
- (5) Woodcraft Training Center: Medium Term 1 (Alpuri)
- (6) Gabion Factory : Short Term 1 (Mingora)



TABLE C-43 LAND USE SUB-TEHSIL CHAKESAR

(Unit: ha)

| Village      | No. of Land Owner | No. of Tenants | No. of Fields Total Area | Total | Cultivated Land |              |         |             |                     |          |               | Uncultivated Land |                  |              |         |        |              |               | Not Available Cultivation |   |       |
|--------------|-------------------|----------------|--------------------------|-------|-----------------|--------------|---------|-------------|---------------------|----------|---------------|-------------------|------------------|--------------|---------|--------|--------------|---------------|---------------------------|---|-------|
|              |                   |                |                          |       | Irrigated       |              |         |             |                     |          |               | Total             | Culturable Waste | Pasture Land | Grazing | Timber | Shrub Forest | Hill of Kalax |                           |   |       |
|              |                   |                |                          |       | Sub-Total       | Annual Crops | Orchard | Mainly Rice | Tube well Pump Irr. | National | Un-irrigation |                   |                  |              |         |        |              |               |                           |   |       |
| 1. Bar Paw   | 4,034             | 2,852          | 14,554                   | 5,173 | 282             | -            | -       | 232         | -                   | -        | -             | 4,941             | 938              | 887          | 3,017   | 1,274  | 2,220        | 1,839         | -                         | - | 644   |
| 1. Chakesar  | 1,022             | 800            | 2,037                    | 789   | 110             | -            | -       | 110         | -                   | -        | -             | 679               | 1,248            | 145          | 468     | 326    | 52           | 121           | -                         | - | 136   |
| 2. Khadang   | 594               | 300            | 1,339                    | 594   | 7               | -            | -       | 7           | -                   | -        | -             | 587               | 745              | 102          | 387     | 60     | 81           | 74            | -                         | - | 51    |
| 3. Kadona    | 392               | 180            | 1,098                    | 404   | 7               | -            | -       | 7           | -                   | -        | -             | 397               | 694              | 35           | 135     | 179    | 71           | 243           | -                         | - | 31    |
| 4. Langbar   | 618               | 500            | 1,937                    | 589   | 22              | -            | -       | 22          | -                   | -        | -             | 567               | 1,348            | 140          | 418     | 197    | 405          | 100           | -                         | - | 88    |
| 5. Bunerwall | 200               | 100            | 1,633                    | 407   | 4               | -            | -       | 4           | -                   | -        | -             | 403               | 1,226            | 61           | 415     | 85     | 135          | 486           | -                         | - | 44    |
| 6. Katkor    | 300               | 100            | 1,129                    | 358   | 35              | -            | -       | 35          | -                   | -        | -             | 323               | 771              | 89           | 108     | 52     | 364          | 112           | -                         | - | 46    |
| 7. Danakoi   | 501               | 201            | 1,559                    | 595   | 15              | -            | -       | 15          | -                   | -        | -             | 580               | 964              | 49           | 312     | 54     | 446          | 48            | -                         | - | 55    |
| 8. Chedam    | 249               | 149            | 625                      | 255   | 4               | -            | -       | 4           | -                   | -        | -             | 251               | 370              | 39           | 181     | 6      | 81           | 23            | -                         | - | 40    |
| 9. Opal      | 38                | 200            | 1,268                    | 392   | 4               | -            | -       | 4           | -                   | -        | -             | 388               | 876              | 88           | 92      | 88     | 526          | 74            | -                         | - | 38    |
| 10. Punial   | 39                | 80             | 397                      | 132   | 6               | -            | -       | 6           | -                   | -        | -             | 126               | 265              | 13           | 85      | 109    | 8            | 23            | -                         | - | 27    |
| 11. Gulibat  | 41                | 190            | 896                      | 426   | 10              | -            | -       | 10          | -                   | -        | -             | 416               | 470              | 98           | 205     | 36     | 51           | 35            | -                         | - | 45    |
| 12. Karora   | 40                | 52             | 636                      | 232   | 8               | -            | -       | 8           | -                   | -        | -             | 224               | 404              | 23           | 211     | 122    | -            | -             | -                         | - | 43    |
| 2. Kuz Paw   | 2,165             | 1,258          | 9,185                    | 1,662 | 177             | -            | -       | 177         | -                   | -        | -             | 1,485             | 7,523            | 396          | 2,253   | 1,699  | 2,429        | 321           | -                         | - | 425   |
| 13. Taloon   | 680               | 680            | 3,838                    | 605   | 15              | -            | -       | 15          | -                   | -        | -             | 590               | 3,233            | 157          | 679     | 250    | 2,024        | 29            | -                         | - | 94    |
| 14. Sarkool  | 319               | 280            | 1,004                    | 201   | 39              | -            | -       | 39          | -                   | -        | -             | 162               | 803              | 59           | 389     | 265    | 4            | 14            | -                         | - | 72    |
| 15. Dacot    | 361               | 203            | 729                      | 137   | 1               | -            | -       | 1           | -                   | -        | -             | 136               | 592              | 35           | 148     | 175    | 175          | 9             | -                         | - | 50    |
| 16. Counagar | 210               | 109            | 860                      | 129   | 40              | -            | -       | 40          | -                   | -        | -             | 89                | 731              | 29           | 327     | 308    | -            | -             | -                         | - | 57    |
| 17. Taktul   | 268               | 129            | 1,779                    | 273   | 74              | -            | -       | 74          | -                   | -        | -             | 199               | 1,604            | 91           | 417     | 469    | 202          | 229           | -                         | - | 96    |
| 18. Danday   | 337               | 137            | 977                      | 317   | 8               | -            | -       | 8           | -                   | -        | -             | 309               | 680              | 25           | 293     | 232    | 24           | 40            | -                         | - | 46    |
| Total        | 6,199             | 4,110          | 23,739                   | 6,835 | 409             | -            | -       | 409         | -                   | -        | -             | 6,426             | 6,904            | 1,283        | 5,270   | 2,973  | 4,649        | 1,560         | -                         | - | 1,059 |

Source: Chakesar Tehsil Office

TABLE C-44 LAND USE SUB-TEHSIL PURAN (1989)

(Unit; ha)

| Village            | No. of land owner | No. of Tenants | No. of Fields Total area | Cultivated Land |              |              |              |             |                     | Uncultivated Land |              |                   |              |              |               | Not available for cultivation |              |               |
|--------------------|-------------------|----------------|--------------------------|-----------------|--------------|--------------|--------------|-------------|---------------------|-------------------|--------------|-------------------|--------------|--------------|---------------|-------------------------------|--------------|---------------|
|                    |                   |                |                          | Total           | Irrigated    |              |              |             |                     | Unirrigated       | Total        | Culturable waiste | Pasture land | Grazing land | Timber Forest |                               | Shrub Forest | Hill of Kalam |
|                    |                   |                |                          |                 | Sub-Total    | Annual crops | Orchard      | Mainly Rice | Tube well Pump Irri |                   |              |                   |              |              |               |                               |              |               |
| <b>Puran U.C.</b>  | <b>4,918</b>      | <b>1,620</b>   | <b>11,778</b>            | <b>4,583</b>    | <b>717</b>   | -            | <b>717</b>   | -           | <b>3,846</b>        | <b>7,215</b>      | <b>590</b>   | <b>2,444</b>      | <b>1,406</b> | <b>2,284</b> | -             | <b>511</b>                    |              |               |
| 1. Sanila          | 935               | 160            | 2,309                    | 888             | 106          | -            | 106          | -           | 722                 | 1,481             | 55           | 388               | 142          | 794          | -             | 102                           |              |               |
| 2. Sandi           | 819               | 220            | 1,979                    | 927             | 112          | -            | 113          | -           | 814                 | 1,052             | 154          | 222               | 56           | 528          | -             | 92                            |              |               |
| 3. Aloch           | 339               | 160            | 807                      | 270             | 53           | -            | 53           | -           | 217                 | 537               | 6            | 195               | 55           | 245          | -             | 36                            |              |               |
| 4. Kotkai          | 236               | 184            | 679                      | 312             | 39           | -            | 39           | -           | 273                 | 367               | 25           | 123               | 194          | -            | -             | 25                            |              |               |
| 5. Kalolai         | 175               | 71             | 156                      | 81              | 23           | -            | 23           | -           | 58                  | 75                | 25           | 20                | 15           | -            | -             | 15                            |              |               |
| 6. Doraserai       | 199               | 96             | 251                      | 106             | 23           | -            | 23           | -           | 83                  | 145               | 15           | 90                | 8            | -            | -             | 32                            |              |               |
| 7. Nim-Kolai       | 561               | 229            | 957                      | 369             | 40           | -            | 40           | -           | 329                 | 588               | 109          | 186               | 229          | -            | -             | 64                            |              |               |
| 8. Kadona          | 351               | 93             | 1,026                    | 401             | 18           | -            | 18           | -           | 383                 | 625               | 40           | 467               | 54           | 31           | -             | 33                            |              |               |
| 9. Bengalai        | 473               | 217            | 1,287                    | 601             | 81           | -            | 81           | -           | 520                 | 686               | 120          | 250               | 146          | 121          | -             | 49                            |              |               |
| 10. Chagam         | 840               | 200            | 2,327                    | 668             | 221          | -            | 221          | -           | 447                 | 1,659             | 41           | 503               | 507          | 545          | -             | 63                            |              |               |
| <b>Maholi U.C.</b> | <b>3,644</b>      | <b>1,828</b>   | <b>13,190</b>            | <b>3,854</b>    | <b>493</b>   | -            | <b>493</b>   | -           | <b>3,361</b>        | <b>9,336</b>      | <b>448</b>   | <b>2,554</b>      | <b>2,710</b> | <b>3,070</b> | -             | <b>544</b>                    |              |               |
| 11. Chowga         | 668               | 701            | 2,161                    | 791             | 171          | -            | 171          | -           | 620                 | 1,370             | 127          | 412               | 574          | 119          | -             | 138                           |              |               |
| 12. Baina          | 345               | 89             | 383                      | 182             | 17           | -            | 17           | -           | 165                 | 201               | 8            | 88                | 5            | 81           | -             | 19                            |              |               |
| 13. Machkundai     | 417               | 113            | 706                      | 322             | 11           | -            | 11           | -           | 311                 | 384               | 36           | 143               | 126          | 39           | -             | 40                            |              |               |
| 14. Shin-Kopra     | 57                | 17             | 306                      | 51              | -            | -            | -            | -           | 51                  | 255               | 2            | 80                | 132          | 7            | -             | 34                            |              |               |
| 15. Marikzee       | 147               | 47             | 270                      | 116             | 12           | -            | 12           | -           | 104                 | 154               | 29           | 38                | 73           | -            | -             | 14                            |              |               |
| 16. Sangrai        | 393               | 141            | 825                      | 403             | 48           | -            | 48           | -           | 355                 | 422               | 99           | 163               | 108          | -            | -             | 52                            |              |               |
| 17. Kozé-Pow       | 518               | 289            | 1,953                    | 351             | 33           | -            | 33           | -           | 318                 | 1,602             | 10           | 452               | 667          | 421          | -             | 52                            |              |               |
| 18. Chaatree       | 317               | 142            | 1,409                    | 319             | 35           | -            | 35           | -           | 284                 | 1,090             | 8            | 198               | 563          | 237          | -             | 34                            |              |               |
| 19. Enawar         | 164               | 73             | 1,844                    | 226             | 18           | -            | 18           | -           | 208                 | 1,618             | 9            | 417               | 83           | 1,081        | -             | 28                            |              |               |
| 20. Pandoria       | 118               | 97             | 974                      | 246             | 56           | -            | 56           | -           | 192                 | 926               | 10           | 247               | 82           | 359          | -             | 28                            |              |               |
| 21. Shaleowlee     | 500               | 119            | 2,359                    | 846             | 92           | -            | 92           | -           | 753                 | 1,514             | 110          | 326               | 297          | 676          | -             | 105                           |              |               |
| <b>Total</b>       | <b>8,562</b>      | <b>3,448</b>   | <b>24,968</b>            | <b>8,417</b>    | <b>1,210</b> | -            | <b>1,210</b> | -           | <b>4,207</b>        | <b>16,551</b>     | <b>1,038</b> | <b>5,008</b>      | <b>4,116</b> | <b>5,334</b> | -             | <b>1,955</b>                  |              |               |

Source: Puran Tehsil Office



TABLE C-45 LAND USE SUB-TEHSIL MARTUNG

(Unit: ha)

| Village             | No. of land owner | No. of Tenants | No. of Fields Total area | Cultivated Land |           |              |         |             |       | Uncultivated Land |              |              |               |              |               | Not available for cultivation |             |
|---------------------|-------------------|----------------|--------------------------|-----------------|-----------|--------------|---------|-------------|-------|-------------------|--------------|--------------|---------------|--------------|---------------|-------------------------------|-------------|
|                     |                   |                |                          | Total           | Irrigated |              |         | Unirrigated | Total | Culturable waste  | Pasture land | Grazing land | Timber Forest | Shrub Forest | Hill of Kalam |                               |             |
|                     |                   |                |                          |                 | Sub-Total | Annual crops | Orchard |             |       |                   |              |              |               |              |               |                               | Mainly Rice |
| Martung U.C.        | 3,460             | 1,455          | 9,737                    | 2,779           | 206       | -            | 206     | -           | 2,573 | 6,958             | 295          | 4,745        | 622           | 547          | -             | -                             | 749         |
| 1. Manz Kolay       | 280               | 134            | 1,297                    | 333             | 31        | -            | 31      | -           | 302   | 964               | 75           | 394          | 283           | 237          | -             | -                             | 35          |
| 2. Koz-Kalay        | 349               | 235            | 773                      | 354             | 31        | -            | 31      | -           | 202   | 419               | 30           | 273          | 35            | 40           | -             | -                             | 41          |
| 3. Mondoria         | 65                | 50             | 365                      | 126             | 5         | -            | 5       | -           | 121   | 239               | 15           | 163          | 9             | 37           | -             | -                             | 15          |
| 4. Mirjalay         | 120               | 9              | 253                      | 81              | 6         | -            | 6       | -           | 75    | 172               | 1            | 143          | -             | 19           | -             | -                             | 9           |
| 5. Serai            | 181               | 43             | 235                      | 41              | 10        | -            | 10      | -           | 31    | 194               | 2            | 167          | -             | -            | -             | -                             | 25          |
| 6. Alarnas-Banda    | 284               | 37             | 542                      | 158             | 10        | -            | 10      | -           | 148   | 384               | 5            | 326          | 23            | -            | -             | -                             | 30          |
| 7. Shaqa            | 83                | 55             | 161                      | 74              | 6         | -            | 6       | -           | 68    | 87                | 3            | 47           | 28            | -            | -             | -                             | 9           |
| 8. Kotki-Mart       | 105               | 25             | 132                      | 67              | 3         | -            | 3       | -           | 64    | 65                | 1            | 55           | -             | -            | -             | -                             | 9           |
| 9. Ashara Sar       | 30                | 6              | 158                      | 28              | -         | -            | -       | -           | 28    | 130               | 15           | 79           | 22            | 11           | -             | -                             | 3           |
| 10. Dora Sar        | 82                | 10             | 130                      | 68              | 1         | -            | 1       | -           | 67    | 62                | 5            | 53           | -             | -            | -             | -                             | 4           |
| 11. Kabal Gram      | 547               | 260            | 2,050                    | 448             | 23        | -            | 23      | -           | 425   | 1,602             | 77           | 1,224        | 134           | -            | -             | -                             | 167         |
| 12. Geer            | 184               | 20             | 310                      | 94              | 8         | -            | 8       | -           | 86    | 216               | 12           | 167          | 18            | -            | -             | -                             | 19          |
| 13. Behar           | 410               | 141            | 887                      | 212             | 45        | -            | 45      | -           | 167   | 675               | 67           | 489          | -             | -            | -             | -                             | 119         |
| 14. Hasham Khel     | 138               | 28             | 363                      | 59              | 6         | -            | 6       | -           | 53    | 304               | 5            | 239          | -             | 12           | -             | -                             | 48          |
| 15. Karnach         | 602               | 402            | 2,081                    | 636             | 21        | -            | 21      | -           | 675   | 1,445             | 42           | 926          | 70            | 191          | -             | -                             | 216         |
| Balkhel U.C.        | 3,034             | 720            | 9,146                    | 1,735           | 144       | -            | 144     | -           | 1,621 | 4,411             | 180          | 2,896        | 168           | 797          | -             | -                             | 420         |
| 16. Dedal           | 517               | 310            | 2,254                    | 533             | 43        | -            | 43      | -           | 490   | 1,721             | 57           | 999          | 137           | 306          | -             | -                             | 222         |
| 17. Mosakhel Sar    | 160               | 46             | 237                      | 75              | -         | -            | -       | -           | 75    | 162               | 3            | 116          | 2             | 30           | -             | -                             | 11          |
| 18. Solay           | 114               | 13             | 179                      | 73              | -         | -            | -       | -           | 73    | 106               | 2            | 99           | -             | -            | -             | -                             | 5           |
| 19. Nask            | 179               | 23             | 228                      | 73              | -         | -            | -       | -           | 73    | 155               | 19           | 70           | -             | 59           | -             | -                             | 7           |
| 20. Godo-Garee      | 197               | 10             | 281                      | 88              | 4         | -            | 4       | -           | 84    | 193               | 5            | 167          | 7             | -            | -             | -                             | 14          |
| 21. Charg Bala-Khel | 46                | 31             | 136                      | 34              | 4         | -            | 4       | -           | 30    | 102               | 5            | 89           | -             | -            | -             | -                             | 8           |
| 22. Torani          | 373               | 41             | 465                      | 129             | 6         | -            | 6       | -           | 123   | 336               | 25           | 200          | -             | 84           | -             | -                             | 27          |
| 23. Dankool         | 325               | 66             | 398                      | 116             | 9         | -            | 9       | -           | 107   | 282               | 14           | 228          | 2             | 18           | -             | -                             | 20          |
| 24. Thitwalan       | 396               | 72             | 811                      | 207             | 22        | -            | 22      | -           | 185   | 604               | 17           | 374          | 11            | 165          | -             | -                             | 37          |
| 25. Thiravopel      | 111               | 3              | 157                      | 78              | -         | -            | -       | -           | 78    | 79                | 11           | 47           | -             | 15           | -             | -                             | 6           |
| 26. Rich-Ban        | 110               | 18             | 233                      | 68              | 1         | -            | 1       | -           | 67    | 165               | 3            | 91           | 1             | -            | -             | -                             | 6           |
| 27. Rish-Kand       | 203               | 44             | 264                      | 92              | 11        | -            | 11      | -           | 81    | 172               | 6            | 144          | -             | 1            | -             | -                             | 21          |
| 28. Pishlore        | 303               | 43             | 503                      | 169             | 14        | -            | 14      | -           | 155   | 334               | 13           | 272          | 8             | 5            | -             | -                             | 36          |
| Total               | 6,494             | 2,127          | 15,883                   | 4,514           | 320       | -            | 320     | -           | 7,194 | 1,369             | 475          | 7,641        | 790           | 1,294        | -             | -                             | 1,169       |

Source: Martung Tehsil Office

TABLE C-46 CROPPED AREA BY SEASON AND CROP (1987/88)

(Unit: ha)

| Crop                    | Total  |     |           |     |             |     | Chakesar |     |           |     |             |     | Puran  |     |           |     |             |     | Martung |     |           |     |             |     |
|-------------------------|--------|-----|-----------|-----|-------------|-----|----------|-----|-----------|-----|-------------|-----|--------|-----|-----------|-----|-------------|-----|---------|-----|-----------|-----|-------------|-----|
|                         | Total  |     | Irrigated |     | Unirrigated |     | Total    |     | Irrigated |     | Unirrigated |     | Total  |     | Irrigated |     | Unirrigated |     | Total   |     | Irrigated |     | Unirrigated |     |
|                         | (ha)   | (%) | (ha)      | (%) | (ha)        | (%) | (ha)     | (%) | (ha)      | (%) | (ha)        | (%) | (ha)   | (%) | (ha)      | (%) | (ha)        | (%) | (ha)    | (%) | (ha)      | (%) | (ha)        | (%) |
|                         |        |     |           |     |             |     |          |     |           |     |             |     |        |     |           |     |             |     |         |     |           |     |             |     |
| 1. Cultivated Area      | 19,770 | 100 | 1,940     | 100 | 17,830      | 100 | 6,860    | 100 | 410       | 100 | 6,450       | 100 | 9,400  | 100 | 1,210     | 100 | 7,190       | 100 | 4,510   | 100 | 320       | 100 | 4,190       | 100 |
| 2. Cropped Area (Total) | 32,624 | 165 | 2,734     | 141 | 29,890      | 168 | 10,967   | 160 | 667       | 162 | 10,300      | 160 | 13,982 | 166 | 1,554     | 129 | 12,428      | 173 | 7,575   | 170 | 513       | 160 | 7,162       | 171 |
| <b>Kharif Crops</b>     | 18,335 | 93  | 1,917     | 99  | 16,418      | 92  | 5,797    | 99  | 411       | 100 | 5,386       | 99  | 7,831  | 93  | 1,186     | 98  | 6,645       | 92  | 3,707   | 82  | 320       | 100 | 3,387       | 81  |
| - Maize                 | 16,806 | 85  | 501       | 26  | 16,305      | 91  | 6,470    | 94  | 132       | 32  | 6,338       | 98  | 6,864  | 81  | 259       | 21  | 6,605       | 92  | 3,472   | 77  | 110       | 34  | 3,362       | 80  |
| - Rice                  | 1,413  | 7   | 1,392     | 72  | 21          | -   | 320      | 5   | 279       | 68  | 41          | 1   | 904    | 11  | 903       | 75  | 1           | -   | 210     | 4   | 210       | 66  | 0           | -   |
| - Pulses & Beans        | 34     | -   | -         | -   | 34          | 1   | 6        | -   | -         | -   | 6           | 3   | 3      | -   | -         | -   | 3           | -   | 25      | 1   | -         | -   | 25          | 1   |
| - Sugarcane             | 46     | 1   | 17        | 1   | 29          | -   | -        | -   | -         | -   | -           | 46  | 1      | 17  | 2         | 29  | -           | -   | -       | -   | -         | -   | -           | -   |
| - Potato                | -      | -   | -         | -   | -           | -   | -        | -   | -         | -   | -           | -   | -      | -   | -         | -   | -           | -   | -       | -   | -         | -   | -           | -   |
| - Vegetables            | 5      | -   | 4         | -   | 1           | -   | 1        | -   | -         | -   | 1           | 4   | 4      | -   | 4         | -   | 0           | -   | -       | -   | -         | -   | -           | -   |
| - Fruits                | 1      | -   | 1         | -   | 0           | -   | -        | -   | -         | -   | -           | -   | 1      | -   | 1         | -   | 0           | -   | -       | -   | -         | -   | -           | -   |
| - Others                | 9      | -   | 2         | -   | 7           | -   | -        | -   | -         | -   | -           | 9   | 9      | -   | 2         | -   | 7           | -   | -       | -   | -         | -   | -           | -   |
| <b>Rabi Crops</b>       | 14,289 | 72  | 817       | 42  | 13,472      | 76  | 4,170    | 61  | 256       | 62  | 3,914       | 61  | 6,151  | 73  | 368       | 31  | 5,783       | 81  | 3,968   | 88  | 193       | 60  | 3,775       | 91  |
| - Wheat                 | 13,698 | 69  | 732       | 38  | 12,966      | 73  | 4,104    | 60  | 229       | 56  | 3,875       | 60  | 5,721  | 68  | 359       | 30  | 5,362       | 80  | 3,873   | 86  | 144       | 45  | 3,729       | 89  |
| - Barley                | 261    | 1   | 12        | 1   | 249         | 1   | 41       | 1   | 2         | -   | 39          | 1   | 180    | 2   | 5         | 1   | 175         | 1   | 40      | 1   | 5         | 2   | 35          | 1   |
| - Rape and Mustard      | 24     | 0   | -         | -   | 24          | -   | -        | -   | -         | -   | -           | -   | 22     | 1   | -         | -   | 22          | -   | 2       | -   | -         | -   | 2           | -   |
| - Fodders               | 138    | 1   | 4         | -   | 134         | 1   | -        | -   | -         | -   | -           | -   | 125    | 1   | -         | -   | 125         | -   | 13      | -   | 4         | 1   | 9           | 1   |
| - Others                | 168    | 1   | 69        | 3   | 99          | 1   | 25       | -   | 25        | 6   | 0           | -   | 103    | 1   | 4         | -   | 99          | -   | 40      | 1   | 40        | 12  | 0           | -   |

Note: It is observed that Kharif Potato is grown in the above area.

Source: Land Revenue Office, Swat District

FIGURE C-1 CROP CALENDAR (PRESENT)

| CROP                     | JAN. | FEB. | MAR. | APR. | MAY | JUN.    | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | Remarks   |
|--------------------------|------|------|------|------|-----|---------|------|------|------|------|------|------|---|
| <u>Kharif</u>            |      |      |      |      |     |         |      |      |      |      |      |      | S: Sowing<br>T: Transplanting<br>H: Harvest<br><br>Black Gram<br>Mungbean |
| Maize                    |      |      |      |      |     | S       |      |      |      |      |      | H    |   |
| Rice                     |      |      |      |      |     | Nursery | T    |      |      |      |      | H    |   |
| Potato                   |      |      |      |      |     |         |      |      |      |      |      |      |   |
| Pulses                   |      |      |      |      |     |         |      |      |      |      |      |      |   |
| Vegetables (Tomato)      |      |      |      |      |     |         |      |      |      |      |      |      |   |
| Fodders (Maize)          |      |      |      |      |     |         |      |      |      |      |      |      |   |
| <u>Rabi</u>              |      |      |      |      |     |         |      |      |      |      |      |      |   |
| wheat                    |      |      |      |      |     |         |      |      |      |      |      |      |   |
| Barley                   |      |      |      |      |     |         |      |      |      |      |      |      |   |
| Rape and Mustard         |      |      |      |      |     |         |      |      |      |      |      |      |   |
| Onion                    |      |      |      |      |     |         |      |      |      |      |      |      |   |
| Vegetables (Cauliflower) |      |      |      |      |     |         |      |      |      |      |      |      |   |
| Sugarcane                |      |      |      |      |     |         |      |      |      |      |      |      |   |
| Fruits (Apple)           |      |      |      |      |     |         |      |      |      |      |      |      |   |

FIGURE C-2 PROPOSED CROPPING PATTERN

PATTERN A (RESERVOIR IRRIGATION)

| Area                     | JAN. | FEB. | MAR. | APR. | MAY | JUN. | JUL. | AUG.  | SEP. | OCT. | NOV. | DEC. | Remarks    |  |
|--------------------------|------|------|------|------|-----|------|------|-------|------|------|------|------|------------|--|
| Swat Sub-Division        | 100% |      |      |      | H   | L.P. | S    | Maize |      |      | L.P. | S    | Wheat      | L.P.: Land Preparation<br>S: Sowing<br>T: Transplantation<br>H: Harvesting |
|                          | 80   |      |      |      |     | L.P. | T    | Rice  |      | H    |      |      | Onion      |  |
|                          | 0    |      |      |      |     |      |      |       |      |      |      |      | Fodders    |  |
|                          | 40   |      |      |      |     |      |      |       |      |      |      |      | Vegetables |  |
|                          | 20   |      |      |      |     |      |      |       |      |      |      |      | Vegetables |  |
| Shangla Par Sub-Division | 100% |      |      |      |     |      |      |       |      |      |      |      | Maize      |  |
|                          | 80   |      |      |      |     |      |      |       |      |      |      |      | Onion      |  |
|                          | 60   |      |      |      |     |      |      |       |      |      |      |      | Rice       |  |
|                          | 40   |      |      |      |     |      |      |       |      |      |      |      | Wheat      |  |
|                          | 20   |      |      |      |     |      |      |       |      |      |      |      | Fodders    |  |
| Buner Sub-Division       | 100% |      |      |      |     |      |      |       |      |      |      |      | Maize      |  |
|                          | 80   |      |      |      |     |      |      |       |      |      |      |      | Wheat      |  |
|                          | 60   |      |      |      |     |      |      |       |      |      |      |      | Fodders    |  |
|                          | 40   |      |      |      |     |      |      |       |      |      |      |      | Vegetables |  |
|                          | 20   |      |      |      |     |      |      |       |      |      |      |      | Sugarcane  |  |
|                          |      |      |      |      |     |      |      |       |      |      |      |      | Fruits     |  |

PATTERN B (IMPROVED TRATIONAL IRRIGATION)

| Area                    | JAN. | FEB. | MAR. | APR. | MAY | JUN. | JUL. | AUG. | SEP. | OCT. | NOV. | DEC. | Remarks |  |
|-------------------------|------|------|------|------|-----|------|------|------|------|------|------|------|---------|--|
| Throughout Project Area |      |      |      |      | H   | L.P. | T    | Rice |      | H    | L.P. | S    | Wheat   | L.P.: Land Preparation<br>S: Sowing<br>T: Transplanting<br>H: Harvesting |
|                         |      |      |      |      |     |      |      |      |      |      |      |      |         |  |

FIGURE C-3 CROSS SECTION SHOWING MAIN FEATURES OF BENCH TERRACES TO BE IMPROVED

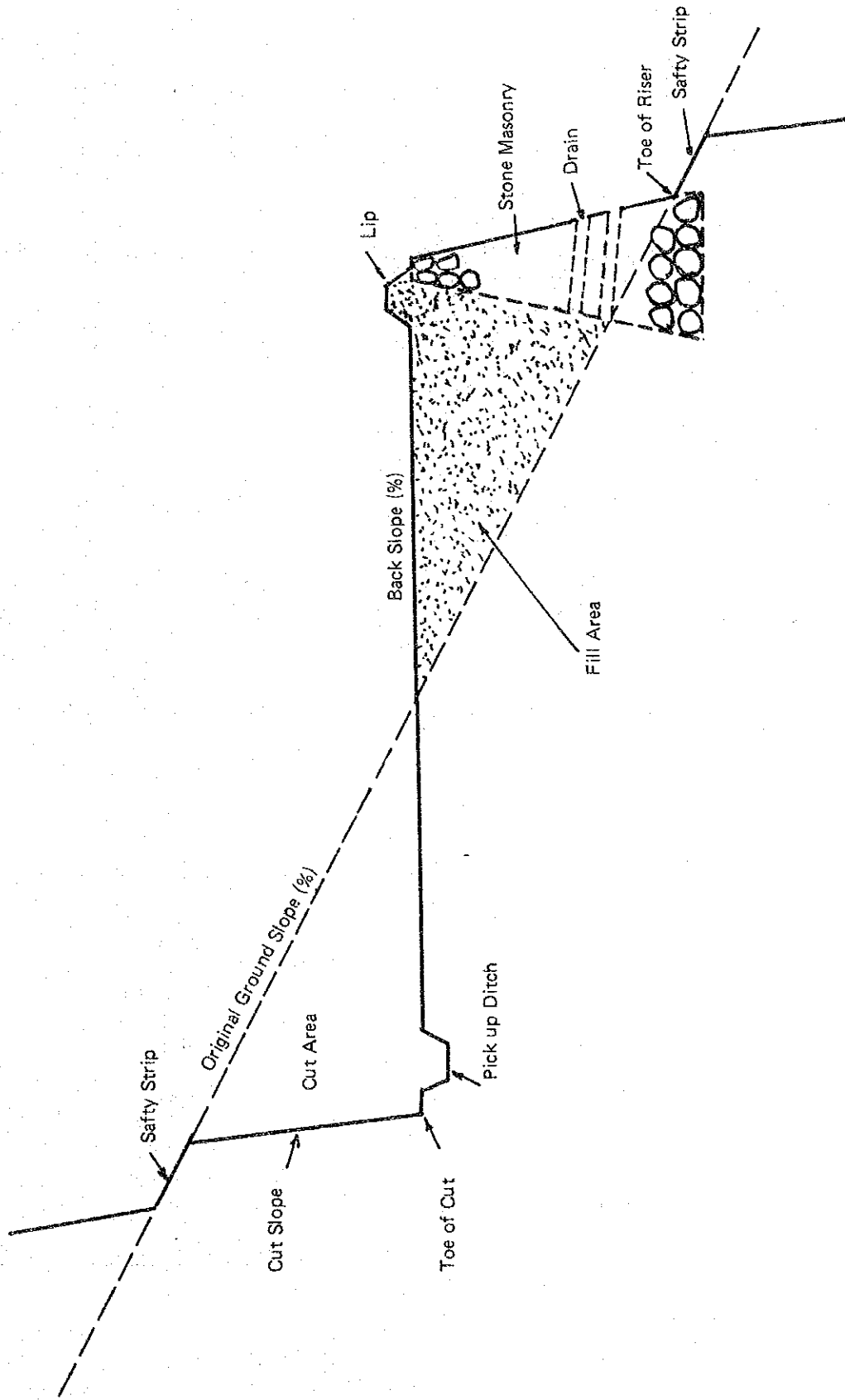


TABLE C-47 LOCATION AND SCALE OF MARKETING FACILITIES

(unit: m<sup>2</sup>)

| Sub-Division | Location<br>(town) | Scale of Marketing Facilities |                              |          | Total |
|--------------|--------------------|-------------------------------|------------------------------|----------|-------|
|              |                    | Size                          | Auction/Office<br>Facilities | Car Park |       |
| Swat         | Mingora            | Big                           | 1,680                        | 8,100    | 9,780 |
|              | Matta              | Medium                        | 840                          | 2,100    | 2,940 |
|              | Khawazakhela       | Medium                        | 840                          | 2,100    | 2,940 |
|              | Bahrain            | Small                         | 420                          | 1,050    | 1,470 |
|              | Kalam              | Small                         | 420                          | 1,050    | 1,470 |
|              | Kabal              | Small                         | 420                          | 1,050    | 1,470 |
| Shangla Par  | Alpuri             | Small                         | 420                          | 1,050    | 1,470 |
|              | Chakesar           | Small                         | 420                          | 1,050    | 1,470 |
|              | Aloch              | Small                         | 420                          | 1,050    | 1,470 |
|              | Martung            | Small                         | 420                          | 1,050    | 1,470 |
| Buner        | Sawari             | Medium                        | 840                          | 2,100    | 2,940 |
|              | Pir Baba           | Small                         | 420                          | 1,050    | 1,470 |

TABLE C-48 LOCATION OF INFORMATION SYSTEM CENTER AND TERMINAL

| Sub-Division<br>(Facilities) | ADBP Swat<br>Regional Office<br>(Computer Center) | Markets<br>(Computer Terminal)                                |
|------------------------------|---|---|
| Swat                         | Saidu Sharif                                      | Mingora<br>Matta<br>Khawazakhela<br>Bahrain<br>Kalam<br>Kobal |
| Shangla Par                  | -   | Alpuri<br>Chakesar<br>Aloch<br>Murtung                        |
| Buner                        | -   | Sawari<br>Pir Baba  |

## ANNEX D. AGRICULTURAL INFRASTRUCTURE





## CONTENTS

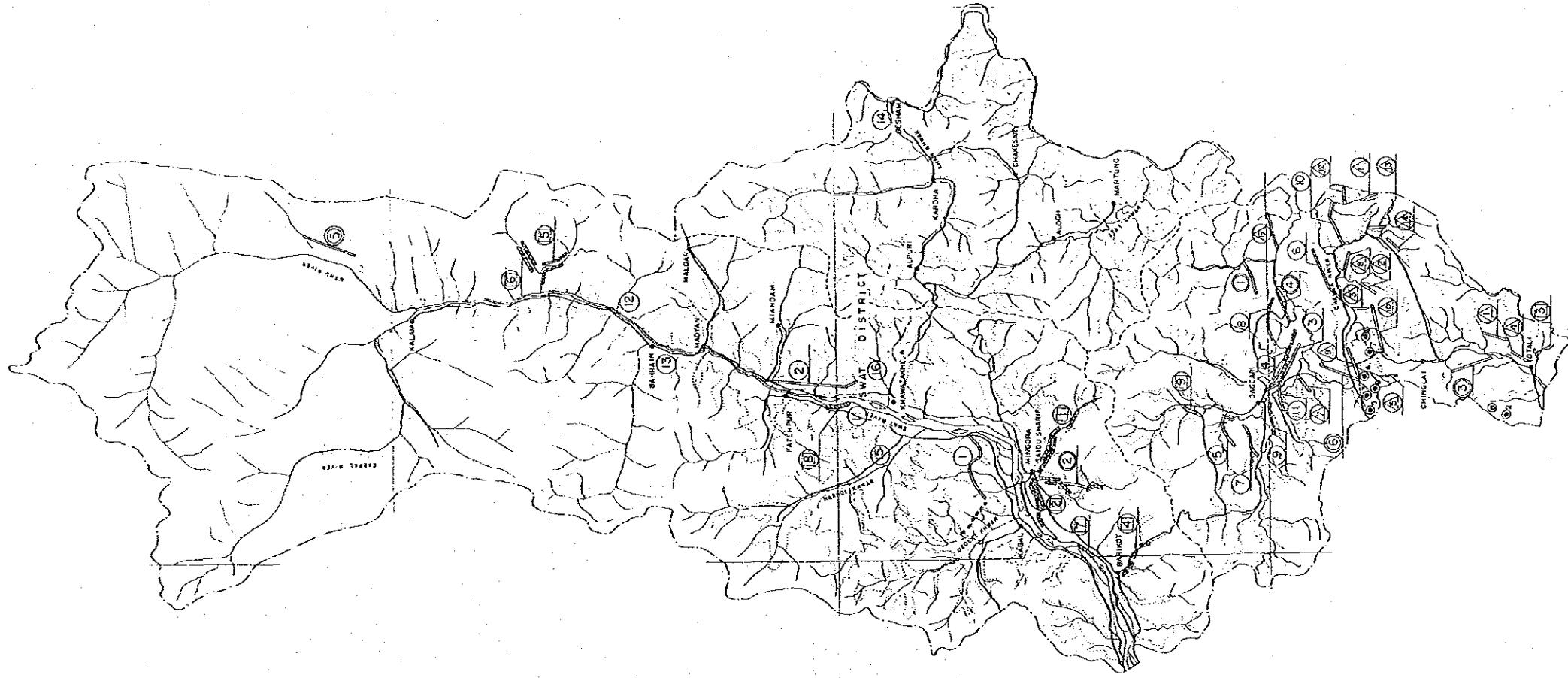
|   | <u>Page</u> |
|---|-------------|
| 1. Existing National Irrigation Schemes and Flood Protection Works in the Project Area .....                                      | D-1         |
| 2. Consumptive Use and Irrigation Water Requirement in Every a Third Month in Accordance with the Proposed Cropping Pattern ..... | D-2         |
| 3. Case Study on Irrigation and Hydel Power Scheme .....  | D-10        |
| 4. List of Facility Plan for Agricultural Infrastructure .....  | D-29        |
| 5. List of Existing Irrigation Channels .....   | D-30        |

## LIST OF TABLES

|            | <u>Page</u>  |
|------------|--|
| Table D-1  | Irrigation Area in Proposed Scheme ..... D-2   |
| Table D-2  | Consumptive Use of Water in Every a Third Month<br>in Accordance with the Proposed Cropping Pattern                      |
|            | - (1) Swat ..... D-3   |
|            | - (2) Shangla Par ..... D-4  |
|            | - (3) Buner ..... D-5  |
| Table D-3  | Irrigation Water Requirement in Every a Third<br>Month in Accordance with the Proposed Cropping<br>Pattern               |
|            | - (1) Swat ..... D-6   |
|            | - (2) Shangla Par ..... D-7  |
|            | - (3) Buner ..... D-8  |
| Table D-4  | Irrigation Water Requirement at Improved<br>Traditional Irrigation System Area in Swat,<br>Shangla Par & Buner ..... D-9 |
| Table D-5. | Result of Case Study on Irrigation and Hydel Power<br>Scheme ..... D-12  |
| Table D-6. | Reservoir's Behaviour Trial  |
|            | - (1) to (4) Sandai-Aloch Case-1 to 4 ..... D-17   |
|            | - (5) to (8) Choga Case-1 to 4 ..... D-21  |
|            | - (9) to (12) Chakesar Case-1 to 4 ..... D-25  |
| Table D-7  | Agricultural Infrastructure: Facility Plan ..... D-29  |
| Table D-8  | List of Existing Irrigation Channels ..... D-30  |

## LIST OF FIGURES

|            | <u>Page</u>   |
|------------|---|
| Figure D-1 | Existing National Irrigation Schemes and Food<br>Protection Works in the Project Area ..... D-1 |
| Figure D-2 | H-V, H-A Curves   |
|            | - (1) Sandai Dam ..... D-13   |
|            | - (2) Choga Dam ..... D-14  |
|            | - (3) Chakesar Dam ..... D-15   |
| Figure D-3 | Behaviour Trial at Sandai Dam ..... D-16  |



EXISTING NATIONAL IRRIGATION SCHEMES AND  
FLOOD PROTECTION WORKS IN THE PROJECT AREA  
RURAL IRRIGATION DIVISION, U.P./INDIA

A. IRRIGATION SCHEMES

| Sl. No.  | Scheme Name  | Area (Ha) |
|--|--|-----------|
| 1  | INPURI KHEIL FLOW IRR. SCHEME (1ST PHASE)                                    | 2,815     |
| 2  | FATEHPUR FLOW IRR. SCHEME  | 486       |
| 3  | GAGRA FLOW IRR. SCHEME   | 533       |
| 4  | DAGGAR LIFT IRR. SCHEME  | 1,255     |
| 5  | CHAZI KHANI FLOW IRR. SCHEME   | 85        |
| 6  | KURYA FLOW IRR. SCHEME   | 162       |
| 7  | LEAI FLOW IRR. SCHEME  | 425       |
| 8  | BANAKATA FLOW IRR. SCHEME  | 223       |
| 9  | JINGARI FLOW IRR. SCHEME   | 181       |
| 10   | CHANDONAI FLOW IRR. SCHEME   |           |
| 11   | IMPROVEMENT AND EXTENSION OF DIVERSION BAND AT BADDANIA                      |           |
| 12   | IMPROVEMENT TO GURNAI IRR. CHANNEL AT BARRAIN                                |           |
| 13   | IMPROVEMENT TO ZOREKALI IRR. CHANNEL AT BARRAIN                              |           |
| 14   | IMPROVEMENT TO CIVIL IRR. CHANNEL AT BETHMAG                                 |           |
| 15   | IMPROVEMENT TO CIVIL IRR. CHANNEL OF KARINDINA TO GARRI AT NATTA             |           |
| 16   | IMPROVEMENT TO CIVIL IRR. CHANNEL ASALA, GASHON, AND SHALPIN AT KAWAZA KHELA |           |
| <b>ON-SOILING SCHEMES (NEW SCHEMES)</b>  |  |           |
| 17   | BUDAL FLOW IRR. SCHEME   | 1,319     |
| 18   | IMPROVEMENT TO CIVIL IRR. CHANNELS IN S. SHARIF                              | 61        |
| 19   | GHURGHUSHTO LIFT IRR. SCHEME   | 45        |
| 20   | KARSHALZAMA FLOW IRR. SCHEME   | 42        |
| 21   | USPURANI FLOW IRR. SCHEME  | 122       |
| 22   | NAWAGAI & KALA KHELA LIFT IRR. SCHEME  | 90        |
| <b>SCHEMES TRANSFERRED TO IRRIGATION DEPT. AFTER COMPLETION BY RAJASTHAN GOVT. CONTROL BOARD</b> |  |           |
| 23   | PANTAN LIFT IRR. SCHEME  | 43        |
| 24   | MARANAI LIFT IRR. SCHEME   | 31        |
| 25   | KORAI LIFT IRR. SCHEME   | 40        |
| 26   | DAGAI LIFT IRR. SCHEME   | 122       |
| 27   | BAMA LIFT IRR. SCHEME  | 63        |
| 28   | SHAHI DHERI LIFT IRR. SCHEME   | 51        |
| 29   | REGA LIFT IRR. SCHEME  | 61        |
| 30   | KHANANO DHERI FLOW IRR. SCHEME   | 21        |
| 31   | NAWAGAI FLOW IRR. SCHEME   | 14        |
| 32   | NANDGAR FLOW IRR. SCHEME   | 76        |
| 33   | PAL BUND FLOW IRR. SCHEME  | 14        |
| 34   | AMOLK FLOW IRR. SCHEME   | 28        |
| 35   | SHARDI BARR FLOW IRR. SCHEME   | 55        |
| 36   | SHEN DUND FLOW IRR. SCHEME   | 60        |
| <b>FLOOD PROTECTION WORKS</b>  |  |           |
| 37   | GUL BIA MAIR TUBE WELL NO. 1   | 122       |
| 38   | GUL BIA MAIRA TUBE WELL NO. 2  | 41        |
| 39   | A.O. TUBE WELL IRR. SCHEME   | 62        |
| 40   | B.A. TUBE WELL IRR. SCHEME   | 84        |
| 41   | S.O. TUBE WELL IRR. SCHEME   | 41        |
| 42   | A.E. TUBE WELL IRR. SCHEME   | 61        |
| 43   | B.E. TUBE WELL IRR. SCHEME   | 61        |
| 44   | K. TUBE WELL IRR. SCHEME   | 61        |

B. FLOOD PROTECTION WORKS

|   |   |
|---|---|
| 1 | PROTECTION OF MINGORA TOWN IN JAWRI KHAWAR                    |
| 2 | PROTECTION OF GOVT. BUILDINGS ALONG MANGHUZAR KHAWAR          |
| 3 | PROTECTION OF DAGAI VILLAGE                                   |
| 4 | CONSTRUCTION OF 6 NOS. SPURS AT BARKOT VILLAGE                |
| 5 | PROTECTION OF TARANG VILLAGE IN TARANG SHAWAR                 |
| 6 | PROTECTION OF MARYAR VILLAGE AND CULTIVATED LANDS             |
| 7 | PROTECTION OF TABAI CHANNEL AND CULTIVATED LANDS              |
| 8 | PROTECTION OF VILLAGE ARAD AND CULTIVATED LANDS IN DRUSHKHELA |
| 9 | PROTECTION OF PACHA KILLI BAZAR                               |

FIGURE D-1 EXISTING NATIONAL IRRIGATION SCHEMES AND FLOOD PROTECTION WORKS IN THE PROJECT AREA



TABLE D-1 IRRIGABLE AREA IN PROPOSED SCHEMES

| Location    | Proposed Scheme |                |                         | Applied Cropping Pattern | Applied Intake Method | River Discharge in Critical Month |                     | Required Unit Discharge |                     | Irrigable Area   |                  | Note |
|-------------|-----------------|----------------|-------------------------|--------------------------|-----------------------|-----------------------------------|---------------------|-------------------------|---------------------|------------------|------------------|------|
|             | River (Khwar)   | Intake Point   | Catchment Area (sq. km) |                          |                       | Winter Crop 1000 M3               | Summer Crop 1000 M3 | Winter Crop cu.m/ha     | Summer Crop cu.m/ha | Winter Crop (ha) | Summer Crop (ha) |      |
| Swat        | Barwai          | Landai         | 87                      | A                        | Weir                  | 1,500                             | 300                 | 2,170                   | 5,420               | 690              | 55               |      |
|             | Harnoi          | Aghai          | 220                     | A                        | Dam                   | 1,500                             | 300                 | 960                     | 2,410               | 1,560            | 125              |      |
|             |                 |                |                         |                          | A                     | Weir                              | 3,700               | 700                     | 2,170               | 5,420            | 1,700            | 130  |
|             | - do -          | Chuprial       | 305                     | A                        | Dam                   | 3,700                             | 700                 | 960                     | 2,410               | 3,850            | 290              |      |
|             | Deolai          | Kabal          | 207                     | A                        | Weir                  | 5,200                             | 900                 | 2,170                   | 5,420               | 2,400            | 170              |      |
| Shangla Par | Kotkai          | Bazarkot       | 18                      | A                        | Dam                   | 100                               | 300                 | 1,650                   | 2,700               | 60               | 110              |      |
|             | Shain           | Alpurai        | 161                     | A                        | Dam                   | 1,100                             | 2,400               | 1,650                   | 2,700               | 670              | 890              |      |
|             | Kana            | Demorai        | 200                     | A                        | Dam                   | 1,400                             | 3,000               | 1,650                   | 2,700               | 850              | 1,110            |      |
|             | Khan            | Karora         | 345                     | A/B                      | Weir                  | 2,400                             | 5,200               | ( 3,710                 | 6,070               | 650              | 850              |      |
|             | Itai            | Sandai         | 45                      | A/B                      | Weir                  | 300                               | 700                 | ( 3,710                 | 6,070               | 80               | 120              |      |
|             | Choga           | Upper Choga    | 56                      | A/B                      | Weir                  | 400                               | 800                 | ( 3,710                 | 6,080               | 110              | 130              |      |
|             | Itai            | Jambal Derai   | 227                     | A                        | Dam                   | 1,600                             | 3,400               | 1,650                   | 2,700               | (970)            | (1,260)          | *1   |
|             | Chekesar        | Surbanai Banda | 37                      | A                        | Dam                   | 300                               | 600                 | 1,650                   | 2,700               | 180              | 360              |      |
|             | Itai            | Kuz Kabuigram  | 337                     | A                        | Dam                   | 2,400                             | 5,100               | 1,650                   | 2,700               | (1,450)          | (1,890)          | *2   |
|             | Buner           | Budar          | Batarai                 | 146                      | A                     | Dam                               | 1,300               | 1,600                   | 890                 | 2,560            | 1,460            | 625  |
| Chamla      |                 | Kotakot        | 102                     | A/B                      | Weir                  | 900                               | 1,100               | ( 2,000                 | 5,750               | 450              | 190              |      |
| - do -      |                 | Khana Derai    | 150                     | A/B                      | Weir                  | 1,400                             | 1,700               | ( 2,000                 | 5,750               | 700              | 300              |      |
| Badri       |                 | Churghust      | 124                     | A/B                      | Weir                  | 1,100                             | 1,400               | ( 5,380                 | 10,130              | 260              | 170              |      |

Remarks: \*1 42.2 MCM of annual discharge at 1/5 year drought, 54.8 MCM of mean annual discharge is available for hydel power generation but no suitable land is available for irrigated farming due to topographical condition.

\*2 62.7 MCM of annual discharge at 1/5 year drought, 83.4 MCM of mean annual discharge is available for hydel power generation but only 320 ha of land is available for irrigated farming due to topographical condition.

TABLE D-2--(1) CONSUMPTIVE USE OF WATER IN EVERY A THIRD MONTH IN ACCORDANCE WITH THE PROPOSED CROPPING PATTERN

|        |              | SWAT  |       |      |         |      |       |      |         |      |            |      |         |      |       | UNIT: mm |  |
|--------|--------------|---|-------|------|---------|------|-------|------|---------|------|------------|------|---------|------|-------|----------|--|
| TERM   | CROP<br>DAYS | EVAPO-<br>TRANS-<br>PIRATION<br>ETO<br>(mm) | MAIZE |      | RICE    |      | WHEAT |      | FODDERS |      | VEGETABLES |      | FRUITS  |      | ONION |          |  |
|        |              |   | KG    | ETC  | KG      | ETC  | KG    | ETC  | KG      | ETC  | KG         | ETC  | KG      | ETC  | KG    | ETC      |  |
| JAN.   | I 10         | 18.0  |       |      |         |      | 0.68  | 12.2 | 0.57    | 10.3 | 1.01       | 18.2 | 0.85    | 15.3 | 0.65  | 11.7     |  |
| 1.8    | II 10        | 18.0  |       |      |         |      | 0.78  | 14.0 | 0.64    | 11.5 | 1.02       | 18.4 | 0.85    | 15.3 | 0.75  | 13.5     |  |
| 1.8    | III 11       | 19.8  |       |      |         |      | 0.84  | 16.6 | 0.71    | 14.1 | 0.91       | 18.0 | 0.85    | 16.8 | 0.83  | 16.4     |  |
| mm/day |              |   |       |      |         |      |       |      |         |      |            |      |         |      |       |          |  |
| FEB.   | I 10         | 25.0  |       |      |         |      | 0.88  | 22.0 | 0.78    | 19.5 | 0.80       | 20.0 | 0.85    | 21.3 | 0.85  | 21.3     |  |
| 2.5    | II 10        | 25.0  |       |      |         |      | 0.91  | 22.8 | 0.87    | 21.8 | 0.80       | 20.0 | 0.85    | 21.3 | 1.05  | 26.3     |  |
| 2.5    | III 8        | 20.0  |       |      |         |      | 0.96  | 19.2 | 0.97    | 19.4 |            |      | 0.85    | 17.0 | 1.05  | 21.0     |  |
| MAR.   | I 10         | 37.0  |       |      |         |      | 0.99  | 36.6 | 1.02    | 37.7 |            |      | 0.85    | 31.5 | 1.05  | 38.9     |  |
| 3.7    | II 10        | 37.0  |       |      |         |      | 1.02  | 37.7 | 1.04    | 38.5 |            |      | 0.85    | 31.5 | 1.05  | 38.9     |  |
| 3.7    | III 11       | 40.7  |       |      |         |      | 1.01  | 41.1 | 1.00    | 40.7 |            |      | 0.85    | 34.6 | 1.05  | 42.7     |  |
| APR.   | I 10         | 55.0  |       |      |         |      | 0.98  | 53.9 | 0.93    | 51.2 |            |      | 0.95    | 52.3 | 0.92  | 50.6     |  |
| 5.5    | II 10        | 55.0  |       |      |         |      | 0.78  | 42.9 | 0.80    | 44.0 |            |      | 0.95    | 52.3 | 0.80  | 44.0     |  |
| 5.5    | III 10       | 55.0  |       |      |         |      | 0.54  | 29.7 | 0.67    | 36.9 |            |      | 0.95    | 52.3 | 0.80  | 44.0     |  |
| MAY    | I 10         | 74.0  |       |      |         |      | 0.37  | 27.4 | 0.63    | 46.6 | 0.36       | 26.6 | 1.05    | 77.7 | 0.80  | 59.2     |  |
| 7.4    | II 10        | 74.0  |       |      |         |      | 0.35  | 25.9 | 0.60    | 44.4 | 0.42       | 31.1 | 1.05    | 77.7 | 0.80  | 59.2     |  |
| 7.4    | III 11       | 81.4  |       |      |         |      | 0.32  | 26.0 | 0.58    | 47.2 | 0.49       | 39.9 | 1.05    | 85.5 | 0.80  | 65.1     |  |
| JUN.   | I 10         | 84.0  | 0.38  | 31.9 | 1.10    | 92.4 |       |      |         |      | 0.66       | 55.4 | 1.15    | 96.6 |       |          |  |
| 8.4    | II 10        | 84.0  | 0.41  | 34.4 | 1.10    | 92.4 |       |      |         |      | 0.84       | 70.6 | 1.15    | 96.6 |       |          |  |
| 8.4    | III 10       | 84.0  | 0.44  | 37.0 | 1.10    | 92.4 |       |      |         |      | 0.98       | 82.3 | 1.15    | 96.6 |       |          |  |
| JUL.   | I 10         | 67.0  | 0.50  | 33.5 | 1.10    | 73.7 |       |      |         |      | 1.03       | 69.0 | 1.15    | 77.1 |       |          |  |
| 6.7    | II 10        | 67.0  | 0.59  | 39.5 | 1.10    | 73.7 |       |      |         |      | 0.93       | 62.3 | 1.15    | 77.1 |       |          |  |
| 6.7    | III 11       | 73.7  | 0.68  | 50.1 | 1.10    | 81.1 |       |      |         |      | 1.05       | 77.4 | 1.15    | 84.8 |       |          |  |
| AUG.   | I 10         | 57.0  | 0.76  | 43.3 | 1.10    | 62.7 |       |      |         |      | 0.93       | 53.0 | 1.15    | 65.6 |       |          |  |
| 5.7    | II 10        | 57.0  | 0.82  | 46.7 | 1.10    | 62.7 |       |      |         |      | 0.81       | 46.2 | 1.15    | 65.6 |       |          |  |
| 5.7    | III 11       | 62.7  | 0.87  | 54.5 | 1.25    | 78.4 |       |      |         |      | 0.80       | 50.2 | 1.15    | 72.1 |       |          |  |
| SEP.   | I 10         | 50.0  | 0.89  | 44.5 | 1.25    | 62.5 |       |      |         |      | 0.80       | 40.0 | 1.10    | 55.0 |       |          |  |
| 5.0    | II 10        | 50.0  | 0.89  | 44.5 | 1.18    | 59.0 |       |      |         |      | 0.80       | 40.0 | 1.10    | 55.0 |       |          |  |
| 5.0    | III 10       | 50.0  | 0.87  | 43.5 | 1.06    | 53.0 |       |      |         |      | 0.36       | 18.0 | 1.10    | 55.0 |       |          |  |
| OCT.   | I 10         | 38.0  | 0.84  | 31.9 | 1.00    | 38.0 |       |      |         |      | 0.42       | 16.0 | 0.90    | 34.2 |       |          |  |
| 3.8    | II 10        | 38.0  | 0.83  | 31.5 | 1.00    | 38.0 |       |      |         |      | 0.49       | 18.6 | 0.90    | 34.2 |       |          |  |
| 3.8    | III 11       | 41.8  | 0.82  | 34.3 | 1.00    | 41.8 | 0.35  | 14.6 |         |      | 0.57       | 23.8 | 0.90    | 37.6 | 0.30  | 12.5     |  |
| NOV.   | I 10         | 24.0  |       |      |         |      | 0.38  | 9.1  | 0.34    | 8.2  | 0.66       | 15.8 | 0.85    | 20.4 | 0.34  | 8.2      |  |
| 2.4    | II 10        | 24.0  |       |      |         |      | 0.41  | 9.8  | 0.37    | 8.9  | 0.82       | 19.7 | 0.85    | 20.4 | 0.36  | 8.6      |  |
| 2.4    | III 10       | 24.0  |       |      |         |      | 0.43  | 10.3 | 0.42    | 10.1 | 0.96       | 23.0 | 0.85    | 20.4 | 0.40  | 9.6      |  |
| DEC.   | I 10         | 16.0  |       |      |         |      | 0.50  | 8.0  | 0.45    | 7.2  | 1.04       | 16.6 | 0.85    | 13.6 | 0.45  | 7.2      |  |
| 1.6    | II 10        | 16.0  |       |      |         |      | 0.55  | 8.8  | 0.47    | 7.5  | 0.77       | 12.3 | 0.85    | 13.6 | 0.50  | 8.0      |  |
| 1.6    | III 11       | 17.6  |       |      |         |      | 0.61  | 10.7 | 0.52    | 9.2  | 0.92       | 16.2 | 0.85    | 15.0 | 0.60  | 10.6     |  |
| (36)   |              |   |       |      |         |      |       |      |         |      |            |      |         |      |       |          |  |
| TOTAL  | 365          | 1,660.7                                     | 601.1 |      | 1,001.8 |      | 499.3 |      | 534.9   |      | 1,018.6    |      | 1,708.9 |      | 617.5 |          |  |

TABLE D-2--(2) CONSUMPTIVE USE OF WATER IN EVERY A THIRD MONTH IN ACCORDANCE WITH THE PROPOSED CROPPING PATTERN

SHANGLA PAR

UNIT: mm

| TERM          | CROP        | EVAPO-<br>TRANS-<br>PIRATION<br>ETO<br>(mm) | MAIZE |         | RICE  |       | WHEAT   |         | FODDERS |      | VEGETABLES |      | FRUITS |      | ONION |      |
|---------------|-------------|---|-------|---------|-------|-------|---------|---------|---------|------|------------|------|--------|------|-------|------|
|               |             |   | KC    | ETC     | KC    | ETC   | KC      | ETC     | KC      | ETC  | KC         | ETC  | KC     | ETC  | KC    | ETC  |
| MONTH         | DAYS        |   |       |         |       |       |         |         |         |      |            |      |        |      |       |      |
| JAN.          | I 10        | 18.0  |       |         |       |       | 0.68    | 12.2    | 0.57    | 10.3 | 1.01       | 18.2 | 0.85   | 15.3 | 0.65  | 11.7 |
|               | II 10       | 18.0  |       |         |       |       | 0.78    | 14.0    | 0.64    | 11.5 | 1.02       | 18.4 | 0.85   | 15.3 | 0.75  | 13.5 |
|               | III 11      | 19.8  |       |         |       |       | 0.84    | 16.6    | 0.71    | 14.1 | 0.91       | 18.0 | 0.85   | 16.8 | 0.83  | 16.4 |
| 1.8<br>mm/day |             |   |       |         |       |       |         |         |         |      |            |      |        |      |       |      |
| FEB.          | I 10        | 25.0  |       |         |       |       | 0.88    | 22.0    | 0.78    | 19.5 | 0.80       | 20.0 | 0.85   | 21.3 | 0.85  | 21.3 |
|               | II 10       | 25.0  |       |         |       |       | 0.91    | 22.8    | 0.87    | 21.8 | 0.80       | 20.0 | 0.85   | 21.3 | 1.05  | 26.3 |
|               | III 8       | 20.0  |       |         |       |       | 0.96    | 19.2    | 0.97    | 19.4 |            |      | 0.85   | 17.0 | 1.05  | 21.0 |
| MAR.          | I 10        | 37.0  |       |         |       |       | 0.99    | 36.6    | 1.02    | 37.7 |            |      | 0.85   | 31.5 | 1.05  | 38.9 |
|               | II 10       | 37.0  |       |         |       |       | 1.02    | 37.7    | 1.04    | 38.5 |            |      | 0.85   | 31.5 | 1.05  | 38.9 |
|               | III 11      | 40.7  |       |         |       |       | 1.01    | 41.1    | 1.00    | 40.7 |            |      | 0.85   | 34.6 | 1.05  | 42.7 |
| APR.          | I 10        | 55.0  |       |         |       |       | 0.98    | 53.9    | 0.93    | 51.2 |            |      | 0.95   | 52.3 | 0.92  | 50.6 |
|               | II 10       | 55.0  |       |         |       |       | 0.78    | 42.9    | 0.80    | 44.0 |            |      | 0.95   | 52.3 | 0.80  | 44.0 |
|               | III 10      | 55.0  |       |         |       |       | 0.54    | 29.7    | 0.67    | 36.9 |            |      | 0.95   | 52.3 | 0.80  | 44.0 |
| MAY           | I 10        | 74.0  |       |         |       |       | 0.37    | 27.4    | 0.63    | 46.6 | 0.36       | 26.6 | 1.05   | 77.7 | 0.80  | 59.2 |
|               | II 10       | 74.0  |       |         |       |       | 0.35    | 25.9    | 0.60    | 44.4 | 0.42       | 31.1 | 1.05   | 77.7 | 0.80  | 59.2 |
|               | III 11      | 81.4  |       |         |       |       | 0.32    | 26.0    | 0.58    | 47.2 | 0.49       | 39.9 | 1.05   | 85.5 | 0.80  | 65.1 |
| JUN.          | I 10        | 84.0  | 0.38  | 31.9    | 1.10  | 92.4  |         |         |         |      | 0.66       | 55.4 | 1.15   | 96.6 |       |      |
|               | II 10       | 84.0  | 0.41  | 34.4    | 1.10  | 92.4  |         |         |         |      | 0.84       | 70.6 | 1.15   | 96.6 |       |      |
|               | III 10      | 84.0  | 0.44  | 37.0    | 1.10  | 92.4  |         |         |         |      | 0.98       | 82.3 | 1.15   | 96.6 |       |      |
| JUL.          | I 10        | 67.0  | 0.50  | 33.5    | 1.10  | 73.7  |         |         |         |      | 1.03       | 69.0 | 1.15   | 77.1 |       |      |
|               | II 10       | 67.0  | 0.59  | 39.5    | 1.10  | 73.7  |         |         |         |      | 0.93       | 62.3 | 1.15   | 77.1 |       |      |
|               | III 11      | 73.7  | 0.68  | 50.1    | 1.10  | 81.1  |         |         |         |      | 1.05       | 77.4 | 1.15   | 84.8 |       |      |
| AUG.          | I 10        | 57.0  | 0.76  | 43.3    | 1.10  | 62.7  |         |         |         |      | 0.93       | 53.0 | 1.15   | 65.6 |       |      |
|               | II 10       | 57.0  | 0.82  | 46.7    | 1.10  | 62.7  |         |         |         |      | 0.81       | 46.2 | 1.15   | 65.6 |       |      |
|               | III 11      | 62.7  | 0.87  | 54.5    | 1.25  | 78.4  |         |         |         |      | 0.80       | 50.2 | 1.15   | 72.1 |       |      |
| SEP.          | I 10        | 50.0  | 0.89  | 44.5    | 1.25  | 62.5  |         |         |         |      | 0.80       | 40.0 | 1.10   | 55.0 |       |      |
|               | II 10       | 50.0  | 0.89  | 44.5    | 1.18  | 59.0  |         |         |         |      | 0.80       | 40.0 | 1.10   | 55.0 |       |      |
|               | III 10      | 50.0  | 0.87  | 43.5    | 1.06  | 53.0  |         |         |         |      | 0.36       | 18.0 | 1.10   | 55.0 |       |      |
| OCT.          | I 10        | 38.0  | 0.84  | 31.9    | 1.00  | 38.0  |         |         |         |      | 0.42       | 16.0 | 0.90   | 34.2 |       |      |
|               | II 10       | 38.0  | 0.83  | 31.5    | 1.00  | 38.0  |         |         |         |      | 0.47       | 18.6 | 0.90   | 34.2 |       |      |
|               | III 11      | 41.8  | 0.82  | 34.3    | 1.00  | 41.8  | 0.35    | 14.6    |         |      | 0.57       | 23.8 | 0.90   | 37.6 | 0.30  | 12.5 |
| NOV.          | I 10        | 24.0  |       |         |       |       | 0.38    | 9.1     | 0.34    | 8.2  | 0.66       | 15.8 | 0.85   | 20.4 | 0.34  | 8.2  |
|               | II 10       | 24.0  |       |         |       |       | 0.41    | 9.8     | 0.37    | 8.9  | 0.82       | 19.7 | 0.85   | 20.4 | 0.36  | 8.6  |
|               | III 10      | 24.0  |       |         |       |       | 0.43    | 10.3    | 0.42    | 10.1 | 0.96       | 23.0 | 0.85   | 20.4 | 0.40  | 9.6  |
| DEC.          | I 10        | 16.0  |       |         |       |       | 0.50    | 8.0     | 0.45    | 7.2  | 1.04       | 16.6 | 0.85   | 13.6 | 0.45  | 7.2  |
|               | II 10       | 16.0  |       |         |       |       | 0.55    | 8.8     | 0.47    | 7.5  | 0.77       | 12.3 | 0.85   | 13.6 | 0.50  | 8.0  |
|               | III 11      | 17.6  |       |         |       |       | 0.61    | 10.7    | 0.52    | 9.2  | 0.92       | 16.2 | 0.85   | 15.0 | 0.60  | 10.6 |
| TOTAL         | (36)<br>365 | 1,660.7                                     | 601.1 | 1,001.8 | 499.3 | 534.9 | 1,018.6 | 1,708.9 | 617.5   |      |            |      |        |      |       |      |



TABLE D-2-(3) CONSUMPTIVE USE OF WATER IN EVERY A THIRD MONTH IN ACCORDANCE WITH THE PROPOSED CROPPING PATTERN

| TERM<br>MONTH |        | CROP<br>DAYS | EVAPO-<br>TRANS-<br>PIRATION<br>ETO<br>(mm) | BUNER |         |           |       |       |       |         |         |            |         |        |     | UNIT: mm |
|---------------|--------|--------------|---|-------|---------|-----------|-------|-------|-------|---------|---------|------------|---------|--------|-----|----------|
|               |        |              |   | MAIZE |         | SUGARCANE |       | WHEAT |       | FODDERS |         | VEGETABLES |         | FRUITS |     |          |
|               |        |              |   | KC    | ETC     | KC        | ETC   | KC    | ETC   | KC      | ETC     | KC         | ETC     | KC     | ETC |          |
| JAN.          | I 10   | 18.0         |   |       | 1.25    | 22.5      | 0.68  | 12.2  | 0.57  | 10.3    | 1.01    | 18.2       | 0.85    | 15.3   |     |          |
|               | II 10  | 18.0         |   |       | 1.25    | 22.5      | 0.78  | 14.0  | 0.64  | 11.5    | 1.02    | 18.4       | 0.85    | 15.3   |     |          |
|               | III 11 | 19.8         |   |       | 1.25    | 24.8      | 0.84  | 16.6  | 0.71  | 14.1    | 0.91    | 18.0       | 0.85    | 16.8   |     |          |
|               |        | mm/day       |   |       |         |           |       |       |       |         |         |            |         |        |     |          |
| FEB.          | I 10   | 25.0         |   |       | 0.95    | 23.8      | 0.88  | 22.0  | 0.78  | 19.5    | 0.80    | 20.0       | 0.85    | 21.3   |     |          |
|               | II 10  | 25.0         |   |       | 0.95    | 23.8      | 0.91  | 22.8  | 0.87  | 21.8    | 0.80    | 20.0       | 0.85    | 21.3   |     |          |
|               | III 8  | 20.0         |   |       | 0.95    | 19.0      | 0.96  | 19.2  | 0.97  | 19.4    |         |            | 0.85    | 17.0   |     |          |
| MAR.          | I 10   | 37.0         |   |       | 0.70    | 25.9      | 0.99  | 36.6  | 1.02  | 37.7    |         |            | 0.85    | 31.5   |     |          |
|               | II 10  | 37.0         |   |       | 0.70    | 25.9      | 1.02  | 37.7  | 1.04  | 38.5    |         |            | 0.85    | 31.5   |     |          |
|               | III 11 | 40.7         |   |       | 0.70    | 28.5      | 1.01  | 41.1  | 1.00  | 40.7    |         |            | 0.85    | 34.6   |     |          |
| APR.          | I 10   | 55.0         |   |       | 0.40    | 22.0      | 0.98  | 53.9  | 0.93  | 51.2    |         |            | 0.95    | 52.3   |     |          |
|               | II 10  | 55.0         |   |       | 0.40    | 22.0      | 0.78  | 42.9  | 0.80  | 44.0    |         |            | 0.95    | 52.3   |     |          |
|               | III 10 | 55.0         |   |       | 0.40    | 22.0      | 0.54  | 29.7  | 0.67  | 36.9    |         |            | 0.95    | 52.3   |     |          |
| MAY           | I 10   | 74.0         |   |       | 0.75    | 55.5      | 0.37  | 27.4  | 0.63  | 46.6    | 0.36    | 26.6       | 1.05    | 77.7   |     |          |
|               | II 10  | 74.0         |   |       | 0.75    | 55.5      | 0.35  | 25.9  | 0.60  | 44.4    | 0.42    | 31.1       | 1.05    | 77.7   |     |          |
|               | III 11 | 81.4         |   |       | 0.75    | 61.1      | 0.32  | 26.0  | 0.58  | 47.2    | 0.49    | 39.9       | 1.05    | 85.5   |     |          |
| JUN.          | I 10   | 84.0         | 0.38  | 31.9  | 0.95    | 79.8      |       |       |       |         | 0.66    | 55.4       | 1.15    | 96.6   |     |          |
|               | II 10  | 84.0         | 0.41  | 34.4  | 0.95    | 79.8      |       |       |       |         | 0.84    | 70.6       | 1.15    | 96.6   |     |          |
|               | III 10 | 84.0         | 0.44  | 37.0  | 1.10    | 79.8      |       |       |       |         | 0.98    | 82.3       | 1.15    | 96.6   |     |          |
| JUL.          | I 10   | 67.0         | 0.50  | 33.5  | 1.10    | 73.7      |       |       |       |         | 1.03    | 69.0       | 1.15    | 77.1   |     |          |
|               | II 10  | 67.0         | 0.59  | 39.5  | 1.10    | 73.7      |       |       |       |         | 0.93    | 62.3       | 1.15    | 77.1   |     |          |
|               | III 11 | 73.7         | 0.68  | 50.1  | 1.10    | 81.1      |       |       |       |         | 1.05    | 77.4       | 1.15    | 84.8   |     |          |
| AUG.          | I 10   | 57.0         | 0.76  | 43.3  | 1.25    | 71.3      |       |       |       |         | 0.93    | 53.0       | 1.15    | 65.6   |     |          |
|               | II 10  | 57.0         | 0.82  | 46.7  | 1.25    | 71.3      |       |       |       |         | 0.81    | 46.2       | 1.15    | 65.6   |     |          |
|               | III 11 | 62.7         | 0.87  | 54.5  | 1.25    | 78.4      |       |       |       |         | 0.80    | 50.2       | 1.15    | 72.1   |     |          |
| SEP.          | I 10   | 50.0         | 0.89  | 44.5  | 1.25    | 62.5      |       |       |       |         | 0.80    | 40.0       | 1.10    | 55.0   |     |          |
|               | II 10  | 50.0         | 0.89  | 44.5  | 1.25    | 62.5      |       |       |       |         | 0.80    | 40.0       | 1.10    | 55.0   |     |          |
|               | III 10 | 50.0         | 0.87  | 43.5  | 1.25    | 62.5      |       |       |       |         | 0.36    | 18.0       | 1.10    | 55.0   |     |          |
| OCT.          | I 10   | 38.0         | 0.84  | 31.9  | 1.25    | 47.5      |       |       |       |         | 0.42    | 16.0       | 0.90    | 34.2   |     |          |
|               | II 10  | 38.0         | 0.83  | 31.5  | 1.25    | 47.5      |       |       |       |         | 0.49    | 18.6       | 0.90    | 34.2   |     |          |
|               | III 11 | 41.8         | 0.82  | 34.3  | 1.25    | 52.3      | 0.35  | 14.6  |       |         | 0.57    | 23.8       | 0.90    | 37.6   |     |          |
| NOV.          | I 10   | 24.0         |   |       | 1.25    | 30.0      | 0.38  | 9.1   | 0.34  | 8.2     | 0.66    | 15.8       | 0.85    | 20.4   |     |          |
|               | II 10  | 24.0         |   |       | 1.25    | 30.0      | 0.41  | 9.8   | 0.37  | 8.9     | 0.82    | 19.7       | 0.85    | 20.4   |     |          |
|               | III 10 | 24.0         |   |       | 1.25    | 30.0      | 0.43  | 10.3  | 0.42  | 10.1    | 0.96    | 23.0       | 0.85    | 20.4   |     |          |
| DEC.          | I 10   | 16.0         |   |       | 1.25    | 20.0      | 0.50  | 8.0   | 0.45  | 7.2     | 1.04    | 16.6       | 0.85    | 13.6   |     |          |
|               | II 10  | 16.0         |   |       | 1.25    | 20.0      | 0.55  | 8.8   | 0.47  | 7.5     | 0.77    | 12.3       | 0.85    | 13.6   |     |          |
|               | III 11 | 17.6         |   |       | 1.25    | 22.0      | 0.61  | 10.7  | 0.52  | 9.2     | 0.92    | 16.2       | 0.85    | 15.0   |     |          |
|               |        | (36)         |   |       |         |           |       |       |       |         |         |            |         |        |     |          |
| TOTAL         | 365    | 1,660.7      | 601.1                                       |       | 1,630.5 |           | 499.3 |       | 534.9 |         | 1,018.6 |            | 1,708.9 |        |     |          |