

**THE ISLAMIC REPUBLIC OF IRAN
MINISTRY OF AGRICULTURE**

THE FEASIBILITY STUDY

ON

**THE IRRIGATION AND DRAINAGE
DEVELOPMENT PROJECT**

IN

THE HARAZ RIVER BASIN

APPENDIXES (C, D, E)

JULY 1993

JAPAN INTERNATIONAL COOPERATION AGENCY

AFA
JR
93-39

THE ISLAMIC REPUBLIC
OF IRAN

THE FEASIBILITY STUDY ON THE IRRIGATION AND DRAINAGE DEVELOPMENT
PROJECT IN THE HARAZ RIVER BASIN

APPENDIXES (C, D, E) JULY 1993

304
833
AFA
LIBRARY

THE ISLAMIC REPUBLIC OF IRAN
MINISTRY OF AGRICULTURE

THE FEASIBILITY STUDY

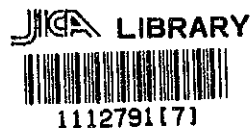
ON

**THE IRRIGATION AND DRAINAGE
DEVELOPMENT PROJECT**

IN

THE HARAZ RIVER BASIN

APPENDIXES (C, D, E)



JULY 1993

JAPAN INTERNATIONAL COOPERATION AGENCY

国際協力事業団

26232

APPENDIX C. AGRICULTURE AND AGRO-ECONOMY

APPENDIX C. AGRICULTURE AND AGRO-ECONOMY

CONTENTS

	<u>Page</u>
C. 1 Land	C1-1
C. 1. 1 Land Ownership in the Project Area	C1-2
C. 1. 2 Present Cropping Area & Cropping Pattern in the Project Area	C1-3
C. 1. 3 Farming Types in the Project Area	C1-5
C. 1. 4 Planned Cropping Area & Cropping Pattern in the Project Area	C1-5
C. 2 Crop	C2-1
C. 2. 1 Present Production of Main Crops in the Project Area	C2-1
C. 2. 2 Present Yield/ha of Paddy in the Project Area	C2-2
C. 2. 3 Yield/ha of Paddy in the Project Area under Project	C2-2
C. 2. 4 Crop Production in the Project Area under Project	C2-3
C. 3 Livestock	C3-1
C. 3. 1 Livestock Population in the Project Area	C3-1
C. 3. 2 Livestock Farming Plan in the Project Area	C3-2
C. 4 Agro-Economy	C4-1
C. 4. 1 Availability of Agri-machinery in the Project Area	C4-1
C. 4. 2 Farmer's Family Budget in the Project Area	C4-2
C. 4. 3 Production Cost of Rice in the Project Area	C4-2
C. 4. 4 Price of Main Crops in the Project Area	C4-2
C. 4. 5 Estimation of Production Cost of Paddy under Project	C4-2

LIST OF TABLES

		<u>Page</u>
Table C. 1 - 1	Land Ownership in the Project Area by Dehstans	C4-3
Table C. 1 - 2	Land Ownership in the Project Area by Irrigation Zones	C4-4
Table C. 1 - 3	Land Ownership in the Project Area by Dehstans in 1988	C4-5
Table C. 1 - 4	Farming Types in the Project Area by Dehstans	C4-6
Table C. 1 - 5	Farming Types in the Project Area by Irrigation Zones	C4-7
Table C. 1 - 6	Planned Land Use by Irrigation Districts and Zones	C4-8
Table C. 1 - 7	Planned Land Use by Sub-Districts	C4-10
Table C. 2 - 1	Production of Main Crops in Ex-Amol & Babol Shahrestans Since 1980/81	C4-12
Table C. 2 - 2	Land Use, Cropping Area and Production of Main Crops in the Project Area by Dehstans	C4-13
Table C. 2 - 3	Land Use, Cropping Area And Production of Main Crops in the Project Area by Irrigation Zones	C4-16
Table C. 2 - 4	Cropping Area and Yield/ha of Paddy in Ex-Amol Shahrestan by Varieties Since 1984/85	C4-19
Table C. 2 - 5	Data on Mid-summer Drying Effects	C4-20
Table C. 2 - 6	Data on Density Spacing of Paddy Planting	C4-21
Table C. 2 - 7	Number of Seedlings per Hill and Corresponding Yields	C4-23
Table C. 3 - 1	Population of Cattle & Sheep/Goat in Total Shahrestan & Project Area	C4-24
Table C. 3 - 2	Livestock Population in the Project Area by Dehstans	C4-25
Table C. 3 - 3	Livestock Population in the Project Area by Irrigation Zones ...	C4-26
Table C. 3 - 4	Basic Factors for Livestock Farming	C4-27
Table C. 3 - 5	Present Livestock Farming	C4-28
Table C. 3 - 6	Planned Livestock Farming	C4-29
Table C. 3 - 7	Estimated Production under the Project	C4-29
Table C. 4 - 1	Availability of Agri-machinery in the Project Area by Dehstans	C4-30
Table C. 4 - 2	Availability of Agri-machinery in the Project Area by Irrigation Zones	C4-31

	<u>Page</u>
Table C. 4 - 3	Result of Sample Survey of Farmer's Family Budget in the Project Area C4-32
Table C. 4 - 4	Production Cost of Rice in Ex-Amol & Babol Shahrestans in 1989, 1990 & 1991 C4-34
Table C. 4 - 5	Market Price of Rice by Variety in Amol City Since 1360 C4-35
Table C. 4 - 6	Farm-Gate Price Fluctuation in 1991-92 in the Project Area ... C4-36
Table C. 4 - 7	Cost Estimation for With-Project Crop Production Cost in the Project Area C4-37

APPENDIX C. AGRICULTURE

C.1 Land

(1) Data Applied

2 data sources related to land ownership are available for the Project Area. The first one is survey result of the MOA during the Master Plan Study in 1985, and the other is Agricultural Census in 1988.

Only available data to grasp the present cropping area in the Project Area is that of Agricultural Census in 1988, but the data is not sufficiently complete and accurate. Therefore, the Project Team collected supplemental information in parallel with measurement of cropping area from the aero-photo taken in 1985.

To clarify the farming type in the Project Area, the MOA survey in 1985 is applicable.

(2) Analysis

The MOA survey in 1985 covers 419 villages in the Project Area, but the Agricultural Census covers 402 villages with a considerable deviation by the Dehstan. Therefore the former data was mainly applied for further analysis about land ownership.

The measured area from the aero-photo in 1985 was mainly applied to clarify the present cropping area and check with the analysed result of the Agricultural Census.

The available data related to the farming type in the Project Area is rather limited, therefore some supplementary survey was also performed as explained in the para. C. 4. 2 below.

C. 1. 1 Land Ownership in the Project Area

The mean land ownership in the Project Area was 1.66 ha per a land owner farmer according to the MOA survey in 1985, but that of the Agricultural Census was 1.56 ha. Tables C. 1 - 1, C. 1 - 2 and C. 1 - 3 show the details of land ownership based on the 2 available data sources, and followings are read therefrom:

1) Total Farmland

The total area of farmland is assumed, filling the blank of each data with the other data, as below:

	MOA Survey in 1985		Agricultural Census in 1988	
	Data	Revised	Data	Revised
Amol Area	39,356 ha	41,060 ha	39,899 ha	43,530
Babolsar Area	7,233	8,120	7,655	8,340
Babol Area	14,144	14,390	12,668	12,760
Total Project Area	60,734 ha	63,570 ha	60,222 ha	64,630 ha

On the other hand, the measured farmland from the aero-photo in 1985 was 84,498 ha, therefore land ownership of some 20,000 ha is not clear. In fact, the measured area is considered as optimum, and actual farmland in the Project Area is less than 84,498 ha but more than 64,630 ha.

2) Mean Size of Land Ownership

The mean sizes of land ownership are compared as below:

	Amol Area	Babolsar Area	Babol Area
MOA survey in 1985	1.72 ha	1.53 ha	1.55 ha
Agricultural Census	1.61 ha	1.61 ha	1.40 ha

3) Category of Farmland

From Table C. 1 - 3, the category of farmland, ratio of Annual Crop : Perennial Crop, is assumed as below:

Size of Land Ownership	Amol Area	Babolsar Area	Babol Area	Whole Area
Less than 0.5 ha	93.2: 6.8	96.2: 3.8	87.6: 12.8	92.1: 7.9
0.5- 1.0 ha	92.3: 7.7	96.5: 3.5	94.0: 6.0	93.2: 6.8
1.0- 2.0 ha	96.3: 3.7	94.9: 5.1	96.7: 3.3	97.4: 2.6
2.0- 3.0 ha	95.6: 4.4	98.5: 1.5	97.3: 2.7	96.2: 3.8
3.0- 5.0 ha	95.6: 4.4	71.3: 28.7	94.5: 5.5	91.7: 8.3
5.0- 10.0 ha	97.7: 2.3	91.7: 8.3	93.4: 6.6	96.0: 4.0
More than 10 ha	75.8: 24.2	60.5: 39.5	34.4: 65.7	64.0: 36.0
Meam	86.7: 13.3	91.1: 8.9	90.5: 9.5	91.4: 8.6

4) Necessity of Cadastral Survey

In general, there is no reliable data to clarify the land problem in the Project Area. Although the Registration Office has boundary survey of Deh as a land ownership unit before the Land Reform, the registered boundary is not showing the present situation. For future agricultural development, the cadastral survey is very important, and the village boundary shall be clarified based on the cadastral survey.

C. 1. 2 Present Cropping Area & Cropping Pattern in the Project Area

The Project Area was measured as 108,009 ha from the topo-map of 1/20,000 provided in 1968. Since that date, considerable forest/pasture lands were reclaimed and the urban areas were also expanded, therefore the present land use was reviewed using the aero-photo taken in 1985. the annual cropping land was measured as 84,498 ha from the revised land use map, and 82,834 ha of which was paddy field. (see Tables in para. 3. 3. 1 of Main Report)

On the other hand, the Agricultural Census shows the annual cropping area as 43,217 ha per 402 villages or 81.9% of total villages in the Project Area. By proportional re-arrangement based on the number of villages,

the annual cropping are become 52,768 ha, which is 62.4% of the measured cropping land from the aero-photo.

According to the field survey by the Project Team, there are considerable illegal cropping land in the Project Area by means of invasion of the nationalized forest land, therefore the actual cropping area will be more than the Agricultural Census.

Although it is rather difficult to grasp the real cropping area from the data in hand, the measured area is considered more accurate than the Agricultural Census. Therefore the measured areas are applied in the F/S Report.

As regard to the cropping pattern most of farmers are applying mono-culture of paddy in the Project Area. In Table C. 1. 3, the total of land ownership was reported as 60,222 ha, but the reported total cropped land in the Agricultural Census was 53,401 ha as shown in Table C. 2 - 2. This means the cropping intensity is 88.7% in the Project Area or 11.3% of farmland is counted as fallow land. However, such ratio of fallow land is hardly acceptable according to the field survey by the Project Team, and the cropping intensity is assumed as more than 110% at present.

The prevailing cropping pattern in the Project Area is assumed as below:

Cropping Pattern	Cropping Area	Annual Total
Paddy mono-culture	74,230 ha	74,230 ha
Orchard	3,700 *	3,700
Paddy + Berseem	4,000	8,000
Paddy + Winter Vegetables	4,040	8,080
Paddy + Barley/Wheat	355	710
Paddy + Pulse (Broad Bean)	205	410
Summer + Winter Vegetables	265	530
Total	86,795 ha	95,660 ha

* Although the orchard is measured as 1,399 ha, considerable area is included in the village area. It is hardly possible to read out the orchard in village area from the aero-photo.

C. 1. 3 Farming Types in the Project Area

From the viewpoint of land ownership, following 5 types are seen in the Project Area as detailed in Tables C. 1. 4 and C. 1. 5:

- 1) Resident Land Owner including self cultivating landowner which shares 74.6% of Farming Family.
- 2) Non-resident Land Owner who is living in other village or urban area shares 4.2%.
- 3) Full-time Crop Sharing who is a kind of permanent tenant either small land owner farmer or landless farmer.
- 4) Part-time Crop sharing who is contracting particular works such as transplanting, weeding, harvesting, etc. and receiving certain portion of harvested crop, and they are either small land owner farmer or landless farmer.
- 5) Landless Farmer who shares 21.2% of Farming Family, and they are engaging either as Full-time or Part-time Crop Sharing. Very few landless farmer are working as wage-base Farm Worker.

C. 1. 4 Planned Cropping Area & Cropping Pattern in the Project Area

The cropping area in the Project is estimated from the measured land use from the aero-photo, which shows the present cropping area as much as 78% of the gross area of the Project Area.

As explained in the para. 4. 3. 1 of the Main Report, the existing forest and pond area are to be kept as it is, and future agricultural development is planned within the present farmland.

Table C. 1 - 6 shows the breakdown of planned land use and Table C. 1 - 7 shows the detailed farmland area by the sub-district.

C. 2 Crop

(1) Data Applied :

3 categories of data are applied to grasp the present crop production in the Project Area, viz., (1) data provided by the Agro-economy & Statistic Division of the Mazandaran General Department of Agriculture, (2) data provided by the Amol & Babol ARTSC, and (3) Agricultural Census in 1988. Some additional data was also obtained through the field survey by the Project Team.

(2) Analysis :

The data supplied by the GDA of Mazandaran were Shahrestan total and it is hardly possible to separate the Project Area therefrom. The data of ARTSC were mainly yield of paddy by variety. Only data available to grasp the production in the Project Area was that of Agricultural Census, but the accuracy is rather doubtful comparing with other data.

C. 2. 1 Present Production of Main Crops in the Project Area

Table C. 2 - 1 shows 10 years production of wheat, barley and paddy in ex-Amol and Babol Shahrestans. Both Shahrestans show a trend of decline of wheat and increase of paddy. The cropping area of barley is also decreasing, but not so sharp as wheat.

It is said that the double cropping of paddy + wheat is rather difficult in the Project Area due to climactical reason, but barley is easier to apply as second crop, and present cropping area of barley is mainly as second crop at the paddy field.

Tables C. 2 - 2 and C. 2 - 3 are showing the cropping area and production of main crops in the Project Area in 1987/88 by Dehstan and by Irrigation Zone.

C. 2. 2 Present Yield/ha of Paddy in the Project Area

Table C. 2 - 4 shows the cropping area and yield of paddy by varieties in Amol area for 7 years since 1984/85. In this table, a trend of decrease of yield of Tarom is observed, while the yield of Khazar is still increasing. The yield of paddy without project implementation is estimated as below:

Year	Recorded Yield			Assume Linear Regression	
	Tarom	Khazar	Amol - 3	Tarom & Amol - 3	Khazar
1985	4,800	-	8,100	-3.5	-
1986	4,100	-	7,900	-2.5	-
1987	4,450	2,200	7,050	-1.5	-2.5
1988	3,440	4,230	5,510	-0.5	-1.5
1989	4,968	5,391	7,898	0.5	-0.5
1990	4,106	5,542	8,144	1.5	0.5
1991	5,030	5,700	6,590	2.5	1.5
1992	3,500	4,500	8,100	3.5	2.5
Average	4,299	4,594	7,142	Total of Square: 42	18
SIGMA XY	-35,445	33,468	-1,977	Tarom : $Y = - 47 (X - 1988.5) + 4,299$	
	-14,541	22,571	8,031	Khazar: $Y = -459 (X - 1989.5) + 4,594$	
	-61,430	60,990	-440	Amol-3: $Y = - 10 (X - 1988.5) + 7,412$	

Estimated Yield in 1992

Tarom :	4,135
Khazar :	5,741
Amol - 3 :	7,375

Yield for without Project

4.1 t/ha
5.7 t/ha
7.4 t/ha

C. 2. 3 Yield/ha of Paddy in the Project Area under Project

Table C. 2 - 5, C. 2 - 6 and C. 2 - 7 show the effect of mid-summer drying, density spacing and number of seedling per hill to the yield of paddy, and the expecting yield of paddy under the Project are summarized as below:

<u>Maturity</u> VARIETY	Yield Increasing Factors				Total
	Controlling Optimum Density	Introducing Mid-summer Drainage	Optimizing Seedling Number	Preventing Fertilizer Loss	
<u>Early</u> LOCAL	2.3%	5.6%	2.4%	2.6%	12.9%
<u>Medium</u> H. Y. V.	4.5	5.6	2.8	3.8	16.7
<u>Late</u> H. Y. V.	4.5	5.6	0.8	2.8	13.7

From the above shown result, the with Project yields are determined as below:

	Current Yield	Expected Increment	With-project Yield
Early matured Local varieties	4.0 t/ha	12.9%	4.5 t/ha
Medium matured high yield varieties	5.4	16.7	6.4
Late matured high yield varieties	7.8	13.7	8.8

C. 2. 4 Crop Production in the Project Area under Project

Table E. 3. 3-1 shows the target crop production in the Project Area after the complete implementation of the Project.

C. 3 Livestock

(1) Data Applied

Livestock population is reported in the Village Gazette in 1986 and Agricultural Census in 1988. Both data are village basis, therefore it is easy to separate the population in the Project Area. As regard to the poultry, the MOA survey in 1985 is available.

(2) Analysis

The Village Gazette reported total population of cattle and sheep/goat, hence the Agricultural Census shows breakdown by varieties and race. There are notable difference in the total population of cattle in two data sources. The difference is considered as coming from the dates of 2 surveys: 16 - 30th of Mehr (7 - 21st of October) in case of the Village Gazette and 5 - 25th Shahrivar (26th of August - 19th of September) in case of the Agricultural Census. Large number of cattle, especially those local variety, are in grazing at the mountain area before harvesting paddy, and they may not be counted into the latter survey.

C. 3. 1 Livestock Population in the Project Area

Table C. 3 - 1 shows the population of cattle and sheep/goat in the Village Gazette, which reported 95,734 cattle and 52,935 sheep/goat in the Project Area sharing 46.5% and 18.9% of total of 2 Shahrestans, of Amol and Babol respectively.

Table C. 3 - 2 and C. 3 - 3 are showing the livestock population in the Agricultural Census by Dehstan and by Irrigation Zone, respectively. Total of sheep and goat was 40,082 head which is 75.7% of the Village Gazette data, while the population of cattle was 52,427 heads or 54.8%.

On the other hand, the MOA survey in 1985 reported the population of cattle in the Project Area as 90,648, which is more or less similar to the Village Gazette. Moreover, there is no reason of sudden decrease of cattle population in 1985 - 88 period in the Project Area, therefore the present population of cattle is

assumed as 90,000 - 100,000 heads in total, 10% of which are pure race or hybrid.

C. 3. 2 Livestock Farming Plan in the Project Area

Table C. 3 - 4 shows the basic factors to formulate the livestock farming plan, and Table C. 3 - 5 shows present situation of the livestock farming the the Project Area. The assumption in the said Table show that the supply ratio of nutrition is only 27.2% for DCP, Digestible Crude Protein, and 97.1% for TDN, Total Digestible Nutrients. Although many of farmers are supplementing the DCP by means of supply of rice bran, bagasse of sugar beet, oil seed cake etc., such notable shortage of DCP is considered as main reason of the low productivity of cattle in the Project Area at present.

Table C. 3 - 6 shows an assumption of livestock farming under the Project introducing Berseem as second crop.

C. 4 Agro-Economy

(1) Data Applied

Except number of agri-machinery and production cost of paddy, all data were directly collected by the Project Team. As for number of agri-machinery, the Agricultural Census is mainly applied as data source. The result of sample survey of production cost of paddy for 3 years of 1989-91 were supplied by the GDA of Mazandaran.

(2) Analysis

The continuous sample surveys of production cost of crops are considered as very valuable, however shortage of experience of surveyors cannot be hidden in the result.

In general, the basic data of agro-economy such as cost of agri-inputs, machinery and labor costs, working hours for various farming works etc. are not yet compiled, and collection of those data is very difficult because different sources report different figures.

The data compilation for crop production is also not satisfactorily despite of execution of many surveys thereto. It is recommended to establish a data bank system of agro-economical information.

C. 4. 1 Availability of Agri-machinery in the Project Area

Tables C. 4 - 1 and C.4 - 2 show the number of agri-machinery in the Project Area by Dehstan and by Irrigation Zone. The tiller is main agri-machine in the Project Area, and one tiller covers 3.78 ha of paddy field. 423 of tractors of 60 - 70 HP are also available, therefore number of cultivating machinery is considered as sufficient.

The Agricultural Census reported that 264 of combines are in the Project Area. Although those combines are working in the Project Area, most of them are owned by the farmers of the eastern regions such a Gorgan, Khorassan, etc. They are working in the Project Area as movable thresher

equipping with improved locally manufactured threshing attachment for paddy.

Number of thresher was reported in the MOA survey in 1985, and covering area per a thresher was 7.5 ha.

C. 4. 2 Farmer's Family Budget in the Project Area

Table C. 4 - 3 shows the result of sample survey of family budget in the Project Area, which was executed in the fall of 1992. 15 villages were selected to cover whole Project Area. 5 - 6 households/village were surveyed in different size of land ownership.

C. 4. 3 Production Cost of Rice in the Project Area

Table C. 4 - 4 shows the result of analysis of production cost survey by the GDA of Mazandaran in 1989 - 91.

C. 4. 4 Price of Main Crops in the Project Area

Table C. 4 - 5 shows the fluctuation of price of rice in Amol for 11 years since 1360 (1981/82).

Table C. 4 - 5 shows the farm-gate prices of agri-products in 1991 - 92 in the Project Area.

C. 4. 5 Estimation of Production Cost of Paddy under Project

In Table C. 4 - 7, the basic factors to estimate the production cost of paddy and Berseem are shown.

TABLE C.1-1 LAND OWNERSHIP IN THE PROJECT AREA BY DEHSTANS

REFERENCE CODES	LAND OWNERSHIP - 1985																
	Landless		Less than 0.5 ha		0.5 - 1.0 ha		1.0 - 2.0 ha		2.0 - 3.0 ha		3.0 - 5.0 ha		More than 5.0 ha		Total		
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	
Dehstan	7																
AU																	
DN001	234	55	15	21	26	37											9
DN002	516	95	36	455	538	125											369
DN003	344	108	33	688	805	211											1,588
DN004	1,158	304	290	957	1,285	405											55
DN005	789	724	275	1,080	830	830											76
DN006	468	262	243	380	286	286											583
DN007	568	380	171	680	543	543											723
DN008	461	425	231	720	526	720											106
DN009	343	621	215	473	744	473											176
Sub-total	4,888	2,974	1,507	7,356	9,336	3,437											8,956
DN010	553	335	142	522	822	606											80
DN011	209	168	72	318	436	248											845
DN012	576	263	74	286	430	270											794
Sub-total	1,338	766	289	1,126	1,697	1,123											842
BU	7																75
DN013	832	619	234	1,009	1,317	590											828
DN014	956	833	410	922	2,083	1,098											727
Sub-total	1,795	1,492	659	2,554	3,919	1,725											727
TOTAL	8,021	5,232	2,454	11,036	14,943	6,285											5,465
				6,779	15,400	3,936											27,717
																	39,356
																	2,982
																	2,590
																	41
																	329
																	27
																	228
																	81
																	666
																	149
																	1,223
																	6,058
																	5
																	27
																	180
																	72
																	554
																	634
																	121
																	198
																	1,214
																	14,144
																	60,734

TABLE C.1-2 LAND OWNERSHIP IN THE PROJECT AREA BY IRRIGATION ZONES

REFERENCE CODES Irrigation zone	LAND OWNERSHIP - 1985														
	Landless (1)	Less than 0.5 ha		0.5 - 1.0 ha		1.0 - 2.0 ha		2.0 - 3.0 ha		3.0 - 5.0 ha		More than 5.0 ha		Total	
		(1)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)
HN1	186	25	8	25	15	21	26	1	2	1	4			259	55
HN2	48	30	7	32	22									110	28
HN3	55	26	11	43	25	45	50	21	23	8	26			198	134
Sub-total	289	81	26	100	62	66	76	22	25	9	30			567	217
HW1	114	8	2	23	27	118	115	45	54	2	6			310	204
HW2	173	52	18	166	134	479	525	292	634	173	589	48	322	1,381	2,252
HW3	377	89	30	213	105	393	514	282	434	138	449	28	201	1,500	1,731
HW4	123	63	24	103	73	186	262	111	254	64	245	28	271	678	1,128
HW5	76	73	141	106	79	107	145	97	241	50	193	10	82	519	880
HW6	76	52	23	71	59	134	211	75	208	49	180	18	168	476	848
Sub-total	939	337	237	682	476	1,417	1,771	882	1,823	478	1,662	131	1,043	4,864	7,041
Total of HW	1,228	418	263	782	536	1,483	1,847	904	1,848	485	1,691	131	1,043	5,431	7,258
KL1		1	0	5	3	15	18	22	42	15	46	4	21	62	129
KL2	95	14	5	16	10	30	40	16	31	16	54	3	21	190	160
KL3	449	232	78	478	322	519	672	351	840	172	637	68	308	2,269	2,857
KL4	301	259	106	471	331	491	602	204	469	72	238	24	146	1,822	1,890
KL5	121	102	37	193	150	231	945	138	385	82	273	10	60	866	1,830
KL6	127	127	46	217	144	290	290	144	369	70	218	7	84	982	1,150
Sub-total	1,093	735	271	1,380	958	1,576	2,586	873	2,115	427	1,465	116	640	6,191	8,016
KR2	2			1	1	3	4	4	10	1	4	1	5	12	22
KR3	186	36	12	237	149	163	273	100	258	62	180	12	78	796	948
KR4	322	195	75	271	196	368	454	280	661	168	659	27	160	1,631	2,204
KR5	198	148	60	156	120	211	300	140	296	86	186	11	88	952	1,050
Sub-total	708	379	147	665	466	745	1,030	524	1,224	319	1,029	51	330	3,391	4,224
HE1	498	173	57	277	153	481	508	303	675	183	573	55	456	1,960	2,421
HE2	165	76	20	106	68	159	218	100	226	80	282	27	183	713	997
HE3	235	69	17	166	136	303	439	202	465	138	459	38	262	1,151	1,778
HE4	193	48	17	130	80	236	312	146	338	100	320	17	109	870	1,177
HE5	283	68	226	234	180	302	393	295	671	129	434	44	295	1,355	2,198
Sub-total	1,364	434	335	913	616	1,481	1,869	1,046	2,374	630	2,087	181	1,305	6,049	8,570
Total of HE, KL, KR	3,185	1,548	754	2,958	2,040	3,802	5,466	2,443	5,714	1,376	4,561	348	2,275	15,631	20,810
AE1	12	6	2	29	23	80	120	60	168	38	135	15	39	240	486
AE2	23	38	12	61	41	80	151	39	97	43	178	9	67	293	547
AE3	303	486	196	454	356	452	658	346	815	210	810	57	817	2,308	3,652
AE4	474	272	95	668	494	348	550	257	625	115	462	33	250	2,165	2,475
AE5	218	228	72	225	170	347	470	162	594	97	454	37	237	1,314	1,997
AE6	131	168	87	243	203	328	483	98	200	60	275	20	118	1,048	1,367
AE7	108	154	63	339	242	286	380	141	375	63	225	17	104	1,108	1,389
AE8	18	25	14	37	35	69	129	61	172	37	161	4	32	251	542
AE9	72	167	82	155	125	226	348	212	359	84	249	22	174	953	1,335
AE10	175	84	25	98	86	128	176	60	167	62	185	25	189	610	808
AE11	628	295	89	571	334	285	476	230	536	177	510	75	683	2,242	2,628
Sub-total	2,162	1,901	737	2,878	2,108	2,627	3,940	1,666	4,106	986	3,624	314	2,710	12,530	17,225
AW1	143	38	20	70	47	163	212	94	231	78	294	14	108	600	911
AW2	48	24	14	48	41	86	134	49	133	57	231	11	81	323	632
AW3	120	104	48	218	195	339	510	230	423	149	548	24	160	1,184	1,885
AW4	103	84	34	117	87	130	179	79	157	42	153	14	86	581	697
AW5	29	60	100	244	198	982	560	172	428	85	318	22	169	1,594	1,773
AW6	57	52	23	127	103	166	248	91	238	102	304	12	121	607	1,036
AW7	313	135	56	235	174	339	550	215	479	113	386	49	370	1,399	2,017
AW8	76	38	17	44	39	105	163	71	196	65	268	14	110	413	791
AW9	354	581	198	589	524	590	867	525	1,149	297	1,095	108	593	3,044	4,426
Sub-total	1,243	1,116	511	1,692	1,409	2,900	3,422	1,528	3,435	988	3,594	268	1,797	9,745	14,168
AU	181	46	40	70	49	104	128	165	133	84	191	6	41	656	582
BU	42	203	150	236	141	120	140	75	164	17	58	7	37	700	690
GRAND TOTAL	8,021	5,232	2,454	8,616	6,285	11,036	14,943	6,779	15,400	3,936	13,720	1,074	7,902	44,693	60,734

TABLE C.1-3 LAND OWNERSHIP IN THE PROJECT AREA BY DEHSTANS IN 1988

VILLAGE CODE	Less than 0.5 ha			0.5 - 1.0 ha			1.0 - 2.0 ha			2.0 - 3.0 ha			3.0 - 5.0 ha			5.0 - 10.0 ha			More than 10.0 ha			Grand Total																										
	Agriculture		Orchard and Nursery	Agriculture		Orchard and Nursery	Agriculture		Orchard and Nursery	Agriculture		Orchard and Nursery	Agriculture		Orchard and Nursery	Agriculture		Orchard and Nursery	Agriculture		Orchard and Nursery	Agriculture		Orchard and Nursery																								
	Area	Total		Area	Total		Area	Total		Area	Total		Area	Total		Area	Total		Area	Total		Area	Total		Area	Total	Area	Total	Area	Total																		
Sub-total	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)																								
DM001	55	13	51	27	22	2	51	28	49	67	22	4	60	8	13	1	5	0	0	1	5	1	3	1	6	0	0	0	0	185	118	59	12	203	129													
DM002	328	30	29	2	188	36	284	159	98	13	250	184	435	515	218	53	447	557	193	387	128	54	195	428	118	357	90	58	120	411	25	108	18	22	25	140	2	18	2	25	2	43	1,177	1,817	842	208	1,211	1,823
DM003	285	222	118	17	313	241	468	287	56	13	480	284	744	940	228	48	748	854	514	1,047	208	58	514	1,134	228	1,107	178	88	229	1,122	76	512	82	38	75	441	10	262	7	127	11	377	2,259	4,028	849	369	2,345	4,399
DM004	524	127	447	14	813	145	738	423	278	24	745	454	1,152	1,418	540	68	1,383	1,462	838	1,334	365	82	840	1,381	868	1,188	233	80	348	1,238	75	437	51	39	78	450	20	578	14	146	20	834	8,504	5,824	1,928	401	4,384	8,015
DM005	328	188	187	12	742	170	1,130	835	238	14	1,138	708	1,823	2,235	860	81	1,832	2,438	558	2,008	894	81	1,037	2,088	818	2,018	340	82	814	2,058	138	810	89	21	135	840	12	273	5	81	13	371	5,385	8,350	2,188	335	5,471	8,887
DM006	284	84	197	18	416	94	438	279	143	18	435	307	845	1,047	851	84	838	1,088	408	855	225	58	408	802	259	842	197	83	290	998	72	338	48	27	82	382	12	185	8	15	12	210	2,392	2,801	1,187	235	2,531	4,070
DM007	325	81	188	7	390	89	745	408	232	20	888	438	1,350	1,781	688	85	2,068	1,748	740	1,444	848	87	880	1,508	601	1,302	201	89	401	1,354	122	873	88	41	122	707	13	233	12	111	14	405	3,554	5,045	1,542	372	3,886	5,285
DM008	263	71	121	5	325	87	435	298	134	8	484	409	878	1,098	292	34	878	1,118	456	878	204	87	455	1,004	271	879	159	44	289	995	47	257	34	15	47	274	8	33	5	50	8	103	2,440	3,811	968	212	2,448	3,852
DM009	351	102	138	1	428	107	810	889	205	5	811	384	880	1,073	866	30	870	1,101	377	801	197	23	377	850	238	786	180	37	237	818	34	180	28	23	34	189	8	187	5	8	189	2,506	3,418	1,017	128	2,551	3,829	
DM010	288	76	81	0	288	87	334	204	84	1	323	207	553	874	188	9	571	808	224	474	77	17	237	458	128	388	58	14	128	408	28	185	18	9	27	178	11	185	5	84	11	249	1,541	2,184	584	110	1,570	2,282
DM011	272	67	288	11	443	79	253	181	130	12	279	171	414	528	228	19	428	528	218	459	138	16	218	474	104	348	77	11	105	381	29	177	28	13	29	181	18	337	11	181	19	488	1,304	2,098	889	258	1,513	2,319
DM012	218	81	122	3	247	85	355	212	75	8	377	220	607	828	177	22	473	602	258	533	127	24	280	558	212	710	122	34	212	1,283	77	117	57	49	77	458	18	187	15	225	18	402	1,487	2,074	882	375	1,881	3,044
DM013	361	159	415	22	810	187	795	438	378	28	802	581	1,280	1,600	705	77	1,285	1,842	548	1,155	883	59	544	1,208	278	928	201	81	273	975	53	820	50	21	57	338	13	133	9	843	14	388	3,824	4,771	2,128	512	3,778	5,284
DM014	744	181	511	13	888	213	1,208	730	520	43	1,201	778	1,748	2,371	858	120	1,755	2,258	800	1,690	481	79	801	1,719	1,008	1,274	279	88	404	1,357	82	445	84	41	82	488	20	187	15	828	20	488	5,000	8,098	2,744	892	5,250	7,384

TABLE C.1-4 FARMING TYPES IN THE PROJECT AREA BY DEHSTANS

REFERENCE CODES	No. of Household		BREAKDOWN OF FARMING HOUSEHOLD - 1985							NON-FARMING HOUSEHOLD	TOTAL HOUSEHOLD	RATIO OF FARMING HOUSEHOLD(%)
	1985 MOA	1986 PBO	Resident Landowner (1)	Non-resident Landowner	Full-time Sharing	Part-time Sharing	Landless (2)	Subtotal (1)+(2)				
AU	9	12	2					7	9	9	100.0	
DN001	367	346	193					234	367	74	83.2	
DN002	1,656	1,521	1,033		12	21		547	1,640	429	79.3	
DN003	2,208	2,607	1,839	5	94	139		285	2,125	331	86.6	
DN004	4,134	4,690	2,469	391	271	378		386	2,855	865	76.7	
DN005	5,647	6,346	4,648	433	305	660		639	5,287	787	87.0	
DN006	2,877	2,547	1,933	164	143	303		324	2,257	308	88.0	
DN007	3,866	3,903	3,047	209	132	364		238	3,285	409	88.9	
DN008	3,459	3,441	2,691	245	155	342		345	3,036	418	87.9	
DN009	3,142	3,162	2,330	91	132	847		432	2,762	771	78.2	
Sub-total	27,165	28,575	20,185	1,538	1,244	3,052		3,437	23,623	4,392	84.3	
DN010	2,977	2,650	1,852		30	747		874	2,726	339	88.9	
DN011	1,598	2,214	804			725		265	869	238	78.5	
DN012	2,077	2,318	646	16		781		925	1,571	510	75.5	
Sub-total	6,652	7,182	3,102	16	30	2,253		2,064	5,166	1,087	82.6	
BU	180	146	95			78		61	156	24	86.7	
DN013	4,489	4,485	2,020			1,678		1,278	3,238	922	78.2	
DN014	6,413	6,038	2,259			2,976		1,031	3,290	1,184	73.5	
Sub-total	11,092	10,669	4,374			4,727		2,370	6,744	2,130	76.0	
TOTAL	44,899	46,426	27,661	1,554	1,274	10,032		7,871	35,533	7,609	82.4	

TABLE C.1-5 FARMING TYPES IN THE PROJECT AREA BY IRRIGATION ZONES

REFERENCE CODES Irrigation zone	No. of Household		BREAKDOWN OF FARMING HOUSEHOLD - 1985						NON-FARMING HOUSEHOLD	TOTAL HOUSEHOLD	RATIO OF FARMING HOUSEHOLD(X)	
	1985 MOA	1986 P80	Resident Landowner (1)	Non-resident Landowner	Full-Time Sharing	Part-Time Sharing	Landless (2)	Subtotal (1)+(2)				
HW1	257	208	71					166	257	60	317	81.1
HW2	110	138	62					48	110	14	124	88.7
HW3	168	173	133		6			49	182	39	221	82.4
Sub-total	555	519	266		6			283	549	113	662	82.9
HW1	296	294	182		4	12		110	292	70	362	80.7
HW2	1,295	1,838	1,133	5	45	91		122	1,256	159	1,414	88.8
HW3	1,560	1,652	1,114		27	37		432	1,546	380	1,926	80.3
HW4	696	747	555	4	47	57		74	629	84	713	88.2
HW5	651	630	433	15	28	14		45	478	41	519	92.1
HW6	561	550	303	13	13	28		59	362	35	397	91.2
Sub-total	5,060	5,511	3,720	37	164	239		842	4,563	769	5,331	85.6
Total of HW	5,615	6,030	3,986	37	170	239		1,125	5,112	882	5,993	85.3
KL1	52	61	42	19	6	10		4	46		46	100.0
KL2	195	229	100		9	23		18	118	54	172	88.6
KL3	2,138	1,948	1,069				731	510	1,579	577	2,156	73.2
KL4	1,828	1,712	654				873	370	1,024	315	1,339	76.5
KL5	920	1,275	425	16			355	209	634	138	772	82.1
KL6	1,101	1,055	322				534	183	505	196	701	72.0
Sub-total	6,234	6,280	2,612	44	29	2,503	1,294	3,906	1,260	5,166	75.3	
KR2	13	156	10		2	4		10		61	71	14.1
KR3	555	644	323	60	26	245		72	395	135	530	74.5
KR4	1,582	1,590	793			481		412	1,205	371	1,576	76.5
KR5	1,050	891	385			457		391	776	88	874	88.8
Sub-total	3,180	3,281	1,511	60	28	1,187		875	2,366	665	3,031	78.2
HE1	2,028	1,948	1,405	161	109	73		167	1,572	372	1,944	80.9
HE2	723	818	504	57	45	36		74	578	123	701	82.5
HE3	1,082	1,138	801	173	67	17		116	917	112	1,029	89.1
HE4	925	1,042	566	126	79	56		153	719	130	849	84.7
HE5	1,492	1,689	655	80	52	337		85	740	300	1,040	71.2
Sub-total	6,250	6,635	3,931	597	352	521		595	4,526	1,037	5,563	81.4
Total of HE, KL, KR	15,664	16,196	8,054	701	409	4,211	2,764	10,818	2,982	13,800	78.4	
AE1	223	205	211	25		76		12	223	26	249	89.6
AE2	248	268	273	38	6	36		35	308	22	330	93.3
AE3	2,562	2,558	2,020	57	8	553		341	2,361	467	2,828	83.5
AE4	2,366	2,129	1,471	8	129	537		817	2,288	351	2,639	86.7
AE5	1,334	1,375	965	31	62	227		164	1,149	269	1,418	81.0
AE6	1,221	1,106	877	31	30	259		131	1,008	155	1,163	85.7
AE7	1,121	1,120	683			378		108	791	121	912	86.7
AE8	351	358	182			51		38	220	41	261	84.3
AE9	867	907	297			489		218	515	95	610	84.4
AE10	617	569	191			245		210	401	92	493	81.3
AE11	2,449	3,264	737			977		616	1,555	576	2,131	73.0
Sub-total	13,359	13,877	7,927	190	235	3,828	2,892	10,819	2,215	13,034	83.0	
AW1	555	554	438	25	5	63		20	458	23	481	95.2
AW2	298	279	229	46	33	26		14	243	3	246	98.8
AW3	1,168	1,118	1,030	36	19	127		100	1,130	189	1,319	85.7
AW4	497	606	394	62		30		3	397	100	497	79.9
AW5	907	1,018	705	148	5	95		30	735	13	748	96.3
AW6	596	589	481	34	36	84		46	527	26	553	95.3
AW7	1,329	1,322	992	89	66	135		175	1,167	147	1,314	88.8
AW8	382	401	297	37	15	28		63	360	21	381	84.5
AW9	3,231	3,297	2,611	135	252	884		407	3,018	721	3,739	80.7
Sub-total	8,983	9,184	7,177	610	431	1,272	858	8,035	1,243	9,278	86.6	
AU	578	742	334	16	29	7		138	470	131	601	78.2
SU	700	397	163			476		98	279	156	435	64.1
GRAND TOTAL	44,899	46,426	27,661	1,554	1,274	10,032	7,871	35,533	7,609	43,141	82.4	

TABLE C. 1-6 PLANNED LAND USE BY IRRIGATION DISTRICTS AND ZONES (1/2)

(Unit: ha)

District	Sub-Dis./Zone	Farmland					Non-Farmland							Grand Total	
		Paddy Field		Upland Crop	Orchard	Total	Waste Land	Forest	Pond	Village Area	River	Road	Sand Dune		Total
		Surface	W. Ground												
HARAZ WEST	/HW1	623	0	623	13	49	37	111	0	24	64	33	0	269	954
	/HW2A	1,424	467	1,891	1	30	6	1,487	0	106	128	102	0	1,829	3,751
	/HW2B	1,755	106	1,861	0	22	0	89	5	139	137	109	0	479	2,362
	/HW2B	2,662	222	2,884	106	135	45	21	23	144	168	152	0	553	3,678
	/HW4	1,531	26	1,557	0	55	12	0	0	103	103	75	0	293	1,905
	/HW5	769	42	811	1	48	3	0	0	81	49	56	0	189	1,049
TOTAL	/HW6	693	62	755	0	36	0	0	56	41	40	0	0	137	928
	/HWU	298	0	298	0	0	2	0	30	15	14	0	0	67	399
		9,755	925	10,680	123	375	105	1,706	28	683	705	581	0	3,816	15,026
HARAZ EAST	/HE1	2,461	360	2,821	0	34	26	0	0	330	155	129	0	640	3,495
	/HE2	1,431	94	1,525	0	3	0	0	0	127	83	75	0	285	1,813
	/HE3	2,106	86	2,192	0	7	2	0	0	270	118	118	0	508	2,707
	/HE4	1,792	0	1,792	0	24	5	0	0	202	98	88	0	393	2,209
	/HE5	360	0	360	0	12	372	0	0	35	21	17	0	73	445
	/HE5A	657	28	685	0	1	686	3	0	55	38	33	0	129	815
Sub-Total	/HE5B	1,640	4	1,644	0	8	0	0	173	89	81	0	0	349	2,001
		10,447	572	11,019	0	89	36	0	6	1,192	602	541	0	2,377	13,485
		155	0	155	2	0	3	0	0	5	206	23	0	237	374
HARAZ EAST	/KL2	412	0	412	0	4	0	0	0	28	24	22	0	74	490
	/KL3	2,371	42	2,413	0	2	4	0	21	286	154	137	0	602	3,017
	/KL4	1,919	38	1,957	8	8	0	0	186	274	135	118	0	713	2,686
	/KL5	1,384	724	2,108	6	20	0	0	116	182	124	108	0	530	2,664
	/KL6	280	6	286	0	5	0	0	0	25	16	16	0	57	348
	/KL6A	399	60	459	0	7	0	0	46	53	30	28	0	157	623
Sub-Total	/KL6B	529	220	749	0	52	0	0	47	121	49	47	0	264	1,065
		7,449	1,090	8,539	16	98	7	0	416	974	738	499	0	2,634	11,287
		298	0	298	2	0	13	41	0	1	22	15	0	92	392
HARAZ EAST	/KR2	365	0	365	0	0	0	0	0	15	30	16	0	61	426
	/KR3	861	20	881	1	4	0	0	0	67	65	40	0	174	1,060
	/KR4	1,551	860	2,411	0	18	4	0	27	151	194	105	0	481	2,910
	/KR5	438	54	492	5	10	2	0	0	96	61	26	0	185	692
		3,513	934	4,447	8	32	19	41	27	332	372	202	0	993	5,480
TOTAL		21,409	2,596	24,005	24	219	62	41	449	2,498	1,713	1,241	0	6,004	30,252
AMOL WEST	/AW1	810	114	924	0	0	0	956	207	76	71	50	0	1,360	2,284
	/AW2	321	372	693	0	0	0	289	172	39	40	33	0	573	1,266
	/AW3A	1,366	308	1,674	0	0	53	43	99	173	112	99	185	774	2,448
	/AW3B	373	196	569	0	23	0	0	30	39	33	27	0	129	721
TOTAL		1,400	226	1,626	0	63	0	0	87	308	104	95	44	638	2,327

TABLE C. 1-6 PLANNED LAND USE BY IRRIGATION DISTRICTS AND ZONES (2/2)

District	Sub-Dis./Zone	Farmland					Non-Farmland					Grand Total				
		Paddy Field		Upland		Orchard	Waste Land	Forest	Pond	Village Area	River		Road	Sand	Dune	
		Surface	W. Ground	W. Total	Crop											Total
Sub-Total		4,270	1,216	5,486	0	86	5,572	53	1,288	595	635	360	304	229	3,474	9,046
AMOL WEST	AW (II)/AW5	1,377	604	1,981	0	15	1,996	0	205	111	128	110	97	51	702	2,698
	/AW6	1,038	102	1,140	0	22	1,162	0	0	33	64	60	55	0	212	1,374
	/AW7	2,579	562	3,141	0	95	3,236	4	11	153	248	213	155	118	902	4,138
	/AW8	405	73	478	16	48	542	0	0	0	52	28	25	0	105	647
	/AW9	760	2	762	0	29	791	10	0	11	29	43	41	0	134	925
	/AW9A	1,552	636	2,188	0	46	2,234	2	26	158	250	126	124	147	833	3,067
	/AW9B	2,029	258	2,287	51	32	2,370	20	0	45	123	127	118	132	565	2,935
Sub-Total		9,740	2,237	11,977	67	287	12,331	36	242	511	894	707	65	448	3,453	15,784
TOTAL		14,010	3,453	17,463	67	373	17,903	99	1,530	1,106	1,529	1,067	919	677	6,927	24,830
AMOL EAST	AE (I) /AE1	642	2	644	10	0	657	0	0	0	27	37	28	0	92	746
	/AE2	738	30	768	0	3	771	0	10	0	60	40	34	0	144	915
	/AE3A	719	12	731	0	2	733	16	0	0	80	127	38	0	261	994
	/AE3Aa	1,557	168	1,725	14	30	1,769	3	41	45	207	310	92	216	914	2,683
	/AE3Ab	557	0	557	0	12	569	0	0	106	127	133	34	263	663	1,232
	/AE3B	888	16	904	0	2	906	0	0	20	79	49	39	0	187	1,093
	/AE3C	439	156	595	0	6	601	0	0	0	13	28	31	0	72	673
Sub-Total		5,540	384	5,924	24	55	6,003	19	51	171	593	724	296	479	2,333	8,336
AMOL EAST	AE (II) /AE4	43	6	49	0	0	49	0	0	0	10	3	3	0	16	65
	/AE4A	223	302	525	0	0	525	0	0	9	20	24	26	0	79	604
	/AE4B	2,303	330	2,633	0	34	2,667	0	70	114	206	140	132	0	662	3,329
	/AE5	1,620	20	1,640	0	4	1,644	0	0	61	137	91	87	0	376	2,020
	/AE6A	1,381	138	1,519	0	7	1,526	0	0	62	113	87	78	0	340	1,866
	/AE6B	921	92	1,013	0	0	1,013	0	0	84	90	65	49	0	288	1,301
Sub-Total		6,491	888	7,379	0	45	7,424	0	70	330	576	410	375	0	1,761	9,185
AMOL EAST	AE (III)/AE7	1,569	286	1,855	0	0	1,855	0	95	181	137	109	96	0	618	2,473
	/AE8	634	372	1,006	0	4	1,010	0	20	82	70	57	50	0	279	1,289
	/AE9	439	774	1,213	0	1	1,214	0	10	142	136	73	62	0	423	1,637
	/AE10	44	1,068	1,112	0	7	1,119	0	0	224	97	70	59	0	450	1,569
	/AE11	359	84	443	0	18	461	0	0	0	40	24	20	0	86	547
	/AE11A	730	284	1,014	0	7	1,021	0	0	171	57	63	51	0	342	1,363
	/AE11B	3,245	646	3,891	0	122	4,013	0	20	402	875	232	203	393	2,125	6,138
		7,020	3,514	10,534	0	159	10,693	0	145	1,202	1,412	628	541	393	4,323	15,016
		19,051	4,786	23,837	24	259	24,120	19	266	1,703	2,581	1,762	1,214	872	8,417	32,537
PROJECT AREA TOTAL		64,257	11,760	75,985	238	1,264	77,487	285	3,545	3,286	7,291	5,247	3,955	1,549	5,158	102,645
Amol Urban				1,813	26	115	1,954	40	2	5	1,461	297	90	0	1,895	3,849
Babol Urban				1,052	1	20	1,073	0	0	211	179	45	7	0	442	1,515
TOTAL				2,865	27	135	3,027	40	2	216	1,640	342	97	0	2,337	5,364
GRAND TOTAL				78,850	265	1,399	80,514	325	3,547	3,502	8,929	5,593	4,052	1,549	27,495	108,009

TABLE C.1-7 PLANNED LAND USE BY SUB-DISTRICTS

District	Sub-District and Zone	Gross Area	(Unit:ha)			Farm Land Total
			Surface W.	Paddy Ground W.	Total	
HARAZ WEST	HW(I)/HW1	954	623	0	623	685
	/HW2A	3,751	1,424	467	1,891	1,922
	/HW2B	2,362	1,755	106	1,861	1,883
	/HW3	3,678	2,662	222	2,884	3,125
	/HW4	1,905	1,531	26	1,557	1,612
	/HW5	1,049	769	42	811	860
	/HW6	928	693	62	755	791
	/HWU	399	298	0	298	338
TOTAL		15,026	9,755	925	10,680	11,216
HARAZ EAST	HE(I)/HE1	3,495	2,461	360	2,821	2,855
	/HE2	1,813	1,431	94	1,525	1,528
	/HE3	2,707	2,106	86	2,192	2,199
	/HE4	2,209	1,792	0	1,792	1,816
	/HE5	445	360	0	360	372
	/HE5A	815	657	28	685	686
	/HE5B	2,001	1,640	4	1,644	1,652
Sub-Total		13,485	10,447	572	11,019	11,108
HARAZ EAST	HE(II)/KL1	394	155	0	155	157
	/KL2	490	412	0	412	416
	/KL3	3,017	2,371	42	2,413	2,415
	/KL4	2,686	1,919	38	1,957	1,973
	/KL5	2,664	1,384	724	2,108	2,134
	/KL6	348	280	6	286	291
	/KL6A	623	399	60	459	466
	/KL6B	1,065	529	220	749	801
Sub-Total		11,287	7,449	1,090	8,539	8,653
HARAZ EAST	HE(III)/KR1	392	298	0	298	300
	/KR2	426	365	0	365	365
	/KR3	1,060	861	20	881	886
	/KR4	2,910	1,551	860	2,411	2,429
	/KR5	692	438	54	492	507
Sub-Total		5,480	3,513	934	4,447	4,487
TOTAL		30,252	21,409	2,596	24,005	24,248
AMOL WEST	AW(I)/AW1	2,284	810	114	924	924
	/AW2	1,266	321	372	693	693
	/AW3A	2,448	1,366	308	1,674	1,674
	/AW3B	721	373	196	569	592
	/AW4	2,327	1,400	226	1,626	1,689
Sub-Total		9,046	4,270	1,216	5,486	5,572
AMOL WEST	AW(II)/AW5	2,698	1,377	604	1,981	1,996
	/AW6	1,374	1,038	102	1,140	1,162
	/AW7	4,138	2,579	562	3,141	3,236
	/AW8	647	405	73	478	542
	/AW9	925	760	2	762	791
	/AW9A	3,067	1,552	636	2,188	2,234
	/AW9B	2,935	2,029	258	2,287	2,370
Sub-Total		15,784	9,740	2,237	11,977	12,331
TOTAL		24,830	14,010	3,453	17,463	17,903

District	Sub-District and Zone	Gross Area	Paddy			(Unit:ha)	
			Surface W.	Ground W.	Total	Farm Land Total	
AMOL	AE(I)/AE1	746	642	2	644	654	
EAST	/AE2	915	738	30	768	771	
	/AE3A	994	719	12	731	733	
	/AE3Aa	2,683	1,557	168	1,725	1,769	
	/AE3Ab	1,232	557	0	557	569	
	/AE3B	1,093	888	16	904	906	
	/AE3C	673	439	156	595	601	
Sub-Total		8,336	5,540	384	5,924	6,003	
AMOL	AE(II)/AE4	65	43	6	49	49	
EAST	/AE4A	604	223	302	525	525	
	/AE4B	3,329	2,303	330	2,633	2,667	
	/AE5	2,020	1,620	20	1,640	1,644	
	/AE6A	1,866	1,381	138	1,519	1,526	
	/AE6B	1,301	921	92	1,013	1,013	
Sub-Total		9,185	6,491	888	7,379	7,424	
AMOL	AE(III)/AE7	2,473	1,569	286	1,855	1,855	
EAST	/AE8	1,289	634	372	1,006	1,010	
	/AE9	1,637	439	774	1,213	1,214	
	/AE10	1,569	44	1,068	1,112	1,119	
	/AE11	547	359	84	443	461	
	/AE11A	1,363	730	284	1,014	1,021	
	/AE11B	6,138	3,245	646	3,891	4,013	
Sub-Total		15,016	7,020	3,514	10,534	10,693	
TOTAL		32,537	19,051	4,786	23,837	24,120	
GRAND TOTAL (Except Urban Area)		102,645	64,257	11,760	75,985	77,487	

TABLE C.2 - 1 PRODUCTION OF MAIN CROPS IN EX-AMOL & BABOL SHAHRESTANS SINCE 1980/81

Years	Wheat			Barley			Rice		
	Land	Yield	Product	Land	Yield	Product	Land	Yield	Product
AMOL SHAHRESTAN:									
1980/81	3,500	2.4	8.4	400	2.2	0.9			
81/82	3,600	1.6	5.9	450	1.8	0.9	48,000	4.1	196.8
82/83	1,944	1.7	3.4	450	1.8	0.8	43,427	4.0	172.2
83/84	2,700	2.5	6.9	500	1.6	0.8	52,000	5.1	264.6
84/85	1,750	2.1	3.6	700	1.8	1.3	55,000	6.1	335.5
85/86	1,400	2.1	2.9	700	1.8	1.3	55,000	6.1	335.5
86/87	1,300	2.1	2.7	500	1.8	0.9	58,000	6.1	353.8
87/88	400	1.8	0.7	350	1.8	0.6	58,000	4.1	232.0
88/89	800	2.0	1.6	350	2.0	0.7	55,200	6.4	353.3
89/90							65,000	5.4	349.2
BABOL SHAHRESTAN:									
1980/81	7,361	2.5	18.4	500	1.3	0.6			
81/82	7,361	2.5	18.4	500	1.3	0.6	55,000	4.4	242.0
82/83	7,000	2.8	19.6	600	1.3	0.8	43,427	3.0	129.3
83/84	5,500	2.9	16.2	550	2.0	1.1	60,000	4.5	270.0
84/85	5,149	2.5	12.9	480	2.0	1.0	62,561	5.0	312.8
85/86	5,000	2.5	12.5	450	2.0	0.9	65,000	5.0	325.0
86/87	5,000	2.2	11.0	450	2.0	0.9	67,000	6.0	402.9
87/88	2,250	2.7	6.1	348	3.0	1.0	68,000	4.4	300.3
88/89	2,000	3.7	6.5	208	3.0	0.6	65,000	4.6	368.6
89/90							65,000	5.4	349.2

Notes: Land: ha Yield: ton/ha Production: 1,000tons

REFERENCE CODES	CROPPING AREA (ha), PRODUCTION (kg) AND YIELD (kg/ha) OF MAIN CROPS (2) - 1988															
	Pulse			Onion			Melon			Alfalfa			Others			
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield	Area
Dehstan																
AU																
DN001																0
DN002																
DN003	1.00	150	150										59.44	388.623	6.555	20.61
DN004	0.34	1,470	4,301	1.66	11,879	7,156							39.70	88,557	2,231	0.72
DN005	2.71	1,049	387	0.71	4,498	6,329							186.32	1,017,581	5,462	28.43
DN006	0.03	100	4,000	0.40	3,188	7,877	0.001	15	15,000				3.05	18,721	6,138	0.47
DN007	0.41	141	344	0.74	2,101	2,858							22.57	74,505	3,301	0.50
DN008	1.48	425	287	0.65	2,181	3,370										3.81
DN009	2.38	2,527	1,061	1.05	5,296	5,058	0.03	500	16,667	0.13	160	1,240	0.13	160	1,240	0.94
Sub-total	8.35	5,862	702	5.20	29,143	5,599	0.03	515	16,613	311.21	1,588,247	5,107				54.98
DN010	0.01	11	1,048	0.48	2,181	4,591							0.15	1,207	7,983	0.02
DN011	0.27	651	2,420	2.57	10,898	4,233	0.03	50	1,667	13.86	18,921	1,365				10.19
DN012	2.14	3,587	1,674	0.76	3,811	5,030	0.01	70	14,000	1.96	12,602	6,429				0.00
Sub-total	2.42	4,249	1,754	3.81	16,890	4,436	0.04	120	3,429	15.97	32,730	2,049				10.21
BU																
DN013	0.32	362	1,141	4.42	25,811	5,842	0.10	130	1,287	39.73	96,318	2,424				6.77
DN014	1.81	4,355	2,400	4.81	26,428	5,494				23.04	45,591	1,978				2.07
Sub-total	2.13	4,717	2,212	9.23	52,239	5,651	0.10	130	1,287	62.77	141,909	2,261				8.84
TOTAL	12.90	14,828	1,149	18.24	98,272	5,388	0.17	765	4,581	389.96	1,763,886	4,523				74.02

REFERENCE CODES	NO. OF TREE, PRODUCTION (kg) AND YIELD (kg/tree) OF MAIN PERENIAL CROPS - 1988															
	Sweet Lemon			Lemon			Mandar in			Orange			Others			
	No.	Production	Yield	No.	Production	Yield	No.	Production	Yield	No.	Production	Yield	No.	Production	Yield	No. of Tree
Dehstan																
AU							116	742	6.4	157	1,102	7.0				
DN001	362	2,319	6.4	1,302	17,296	13.3	1,471	18,785	12.8	1,471	18,785	12.8				907
DN002	697	12,007	17.2	28,919	275,634	9.5	32,166	553,770	17.2	32,166	553,770	17.2				1,735
DN003	951	13,608	14.3	969	5,721	5.9	48,800	1,099,766	22.5	43,139	887,519	20.6				512
DN004	1,622	28,872	17.8	73	772	10.6	30,983	387,746	12.5	31,333	414,845	13.2				4,178
DN005	4,480	23,806	5.3	177	1,827	10.3	34,556	430,466	12.5	56,633	812,666	14.6				9,567
DN006	306	3,481	11.4	67	1,101	16.4	33,851	365,079	10.8	51,161	827,357	16.2				13,428
DN007	360	4,122	11.5	12	124	10.3	13,144	146,813	11.2	27,849	445,412	16.0				542
DN008	841	31,388	37.3	31	397	12.8	6,983	95,508	13.7	16,911	236,154	14.0				1,844
Sub-total	9,619	119,603	12.4	1,378	11,027	8.0	210,774	3,108,621	14.7	298,417	4,858,494	16.2				34,841
DN010	397	4,987	12.6	56	356	6.4	7,587	76,958	10.1	9,684	114,780	11.9				412
DN011	850	7,709	9.1	236	2,512	10.6	12,317	120,175	9.8	14,175	180,602	12.7				3,403
DN012	480	8,954	18.7	47	145	3.1	18,333	348,678	19.0	20,201	513,028	25.4				1,160
Sub-total	1,727	21,650	12.5	339	3,013	8.9	38,237	546,011	14.3	44,040	808,380	18.4				4,975
BU	46	395	8.6	134	496	3.7	1,285	4,934	3.8	1,493	8,620	5.8				
DN013	1,643	26,087	15.8	176	1,291	7.3	19,501	210,098	10.8	28,472	304,379	10.7				5,521
DN014	2,790	43,554	15.6	218	2,698	12.4	24,986	318,069	12.7	41,893	855,750	20.4				4,058
Sub-total	4,479	69,966	15.6	528	4,485	8.5	45,772	533,101	11.6	71,858	1,168,749	16.3				9,579
TOTAL	15,825	211,239	13.3	2,245	18,525	8.3	294,783	4,187,733	14.2	415,315	6,835,603	16.5				49,395

TABLE C.2 - 3 LAND USE, CROPPING AREA AND PRODUCTION OF MAIN CROPS IN THE PROJECT AREA BY IRRIGATION ZONES

REFERENCE CODES	LAND USE IN 1988 (ha)				CROPPING AREA (ha), PRODUCTION (kg) AND YIELD (kg/ha) OF MAIN CROPS - 1988												
	Irrigation zone	Orchard Nursery	Annual Crops		Total Cropped	Rice			Barley			Wheat					
			Total	Irrigated		Area	Production	Yield	Area	Production	Yield	Area	Production	Yield			
NWU1	8		60	60	66	60	233,095	3,884									
NWU2	6		56	56	63	56	223,095	3,955									
NWU3	16		123	123	139	140	397,471	2,839									
Sub-total	29		239	239	268	256	853,661	3,331									
HW1	55		259	204	315	206	820,755	3,993	0.30	3,000	10,000						
HW2	168		1,980	1,948	3,304	2,857	10,602,877	3,711				0.05	300	6,000			
HW3	250		2,188	2,182	2,817	1,990	8,108,289	4,074									
HW4	44		951	947	1,277	948	3,065,856	3,234									
HW5	49		589	577	638	544	1,782,243	3,276									
HW6	61		698	688	759	680	2,262,310	3,325									
Sub-total	627		6,646	6,554	9,110	7,226	26,642,330	3,687	0.30	3,000	10,000	0.05	300	6,000			
Total of HW	656		6,885	6,793	9,378	7,482	27,495,991	3,675	0.30	3,000	10,000	0.05	300	6,000			
YL1	1		85	85	86	86	511,877	5,928									
YL2	3		32	32	67	32	145,760	4,576									
YL3	146		1,668	1,658	1,814	1,639	5,945,703	3,628									
YL4	154		1,139	1,124	1,293	1,090	3,445,638	3,182				0.30	240	800			
YL5	83		628	624	716	609	1,892,345	3,107									
YL6	165		544	546	709	539	1,793,434	3,326				1.00	1,000	1,000			
Sub-total	558		4,097	4,069	4,687	3,995	13,734,757	3,438				1.30	1,240	954			
KR2	36		198	190	226	192	550,927	2,870									
KR3	50		695	685	1,172	688	3,029,510	4,405	3.30	2,203	668	0.68	442	650			
KR4	50		984	976	1,031	934	3,809,271	4,080									
KR5	20		422	419	442	412	1,497,655	3,638									
Sub-total	156		2,298	2,271	2,871	2,225	8,887,363	3,994	3.30	2,203	668	0.68	442	650			
HE1	84		1,684	1,676	2,855	1,910	7,879,821	4,128	0.10	300	3,000	0.05	300	6,000			
HE2	33		940	637	965	844	2,359,984	3,662									
HE3	156		1,563	1,562	2,623	1,515	7,027,451	4,640									
HE4	56		1,174	1,174	1,574	1,122	5,504,389	4,908	8.32	15,303	1,839	11.14	19,880	1,785			
HE5	42		1,022	990	1,047	991	4,297,616	4,336	0.16	150	938	16.46	55,501	3,372			
Sub-total	371		6,583	6,238	9,063	6,182	27,069,281	4,379	8.58	15,753	1,836	27.65	75,681	2,737			
Total of HE, KL, KR	1,085		12,978	12,578	16,621	12,402	49,691,381	4,007	11.88	17,958	1,511	29.63	77,363	2,611			
AE1	27		583	582	821	399	1,463,414	3,666	4.00	8,000	2,000	6.00	18,000	3,000			
AE2	17		491	491	568	489	1,942,104	3,974									
AE3	141		2,688	2,677	3,384	2,636	8,818,818	3,348				9.60	4,151	432			
AE4	40		1,632	1,631	1,774	1,624	5,694,641	3,506									
AE5	50		1,719	1,718	2,620	1,625	5,744,708	3,535									
AE6	86		1,210	1,188	1,334	1,186	3,876,751	3,268									
AE7	140		1,125	1,239	1,839	1,234	3,927,467	3,183	0.10	50	500						
AE8	10		228	226	238	221	673,614	3,047	8.25	8,105	982	7.75	7,653	987			
AE9	52		2,263	983	2,314	905	2,725,235	3,011									
AE10	61		476	475	536	474	1,458,992	3,076									
AE11	380		2,367	2,384	2,747	2,146	4,622,145	2,154	28.00	64,722	2,311	27.10	56,901	2,100			
Sub-total	1,004		14,782	13,592	17,956	12,940	40,947,889	3,164	40.35	80,877	2,004	50.45	86,705	1,719			
AW1	3		214	214	217	214	412,950	1,931									
AW2	5		143	143	148	141	335,146	2,370									
AW3	35		618	621	653	629	1,566,024	2,491									
AW4	22		515	515	537	507	1,580,236	3,114									
AW5	23		1,033	1,033	1,057	1,045	2,674,104	2,559									
AW6	31		761	761	792	1,317	6,740,741	5,120									
AW7	34		960	959	994	995	3,269,388	3,286									
AW8	48		640	630	683	627	2,556,355	4,079	3.00	7,200	2,400						
AW9	172		2,801	2,797	2,973	2,774	9,226,983	3,326				0.22	531	2,391			
Sub-total	373		7,686	7,673	8,059	8,249	28,361,927	3,438	3.00	7,200	2,400	0.22	531	2,391			
AU	62		581	581	991	582	2,640,987	4,539									
BU	91		306	306	397	291	845,697	2,907									
GRAND TOTAL	3,271		43,217	41,525	53,401	41,945	149,983,872	3,576	55.53	109,033	1,963	80.35	164,899	2,052			

REFERENCE CODES	CROPPING AREA (ha), PRODUCTION (kg) AND YIELD (kg/ha) OF MAIN CROPS (2) - 1988													
	Irrigation zone	Pulse			Onion			Melon			Alfalfa			Others
		Area	Production	Yield	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield	Area
HW1														0.10
HW2														
HW3														
Sub-total														0.10
HW1											0.40	3,600	8,750	0.30
HW2											29.30	26,554	906	0.30
HW3	1.00	150	150								56.85	385,123	6,774	20.31
HW4											12.40	63,003	5,081	0.42
HW5	0.40	121	302								3.00	60,000	20,000	
HW6	0.02	70	3,500								2.50	1,251	500	0.34
Sub-total	1.42	341	240								104.45	539,431	5,164	21.67
Total of HW	1.42	341	240								104.45	539,431	5,164	21.77
KL1														
KL2														
KL3	0.07	150	2,308	0.78	6,388	8,227					13.10	29,424	2,246	1.48
KL4	0.04	120	3,000	1.57	6,775	4,303					1.24	6,173	4,869	1.47
KL5	1.13	2,435	2,160	1.34	7,199	5,370					1.50	2,710	1,806	0.92
KL6	0.48	1,174	2,444	0.91	6,388	7,045					19.64	31,607	1,609	1.46
Sub-total	1.71	3,879	2,265	4.60	26,750	5,817					35.48	69,914	1,970	5.33
KR2	0.14	1,240	8,857	0.64	6,404	10,076								
KR3	0.04	34	850	0.51	1,907	3,776					73.31	543,296	7,411	0.64
KR4	0.03	30	1,111	3.24	17,383	5,370	0.101	130	1,287		25.89	53,814	2,079	3.37
KR5	0.02	25	1,697	0.32	2,561	8,079					3.16	17,224	5,449	0.07
Sub-total	0.22	1,329	5,986	4.69	28,255	6,019	0.101	130	1,287		102.36	614,334	8,002	3.48
HE1	0.80	360	449	0.29	2,430	8,511					3.42	14,702	4,299	0.08
HE2				0.03	120						7.30	9,052	1,240	
HE3	0.40	500	1,250	0.28	1,858	6,749					18.60	49,832	2,679	0.64
HE4	0.36	236	661	0.39	2,810	7,139					31.70	181,009	5,711	0.86
HE5	0.01	20	4,000	0.41	2,972	7,299					45.11	204,209	4,527	27.45
Sub-total	1.56	1,116	714	1.39	10,190	7,323					106.13	458,804	4,323	28.44
Total of HE, KL, KR	3.50	6,324	1,808	10.68	65,195	6,102	0.101	130	1,287		243.97	1,143,052	4,685	37.25
AE1														0.02
AE2											0.20	1,050	5,250	0.00
AE3	2.68	1,281	478	0.38	2,311	6,154					0.05	1,000	20,000	0.49
AE4	0.05	20	400	0.11	2	14								0.01
AE5	0.26	79	304								0.30	1,500	5,000	0.01
AE6	0.00	1	2,000	0.42	1,610	3,836					0.15	1,207	7,983	0.00
AE7	0.02	64	3,168	0.13	2,228	16,516					0.09	17	11,333	0.01
AE8	0.00	5	5,000	0.04	467	10,447								0.01
AE9	0.50	847	1,683	2.61	9,183	3,521								0.01
AE10	0.03	32	1,181	0.20	1,387	8,942								0.05
AE11	2.25	4,083	1,816	1.28	5,355	4,168	0.035	120	3,429		15.82	31,506	1,991	10.18
Sub-total	5.79	6,412	1,107	5.18	22,543	4,354	0.035	120	3,429		16.52	36,290	2,196	10.79
AW1														
AW2				0.02	50									
AW3														
AW4	0.01	20	2,000	0.70	1,751	2,501								
AW5	0.03	20	667	0.20	666	3,420								0.41
AW6				0.02	300									0.00
AW7	1.35	375	278	0.20	500	2,500								
AW8				0.09	407		0.001	15	15,000		12.75	8,253	647	0.10
AW9	0.81	1,336	1,656	1.14	6,407	5,622	0.030	500	16,667		0.33	260	790	3.69
Sub-total	2.20	1,751	797	2.36	10,083	4,266	0.031	515	16,613		13.08	8,513	651	4.20
AU											7.55	24,008	3,180	0.00
BU				0.02	451						4.20	12,602	3,000	
GRAND TOTAL	12.90	14,828	1,149	18.24	98,272	5,388	0.17	765	4,581		389.77	1,763,886	4,525	74.02

REFERENCE CODES	NO. OF TREE, PRODUCTION (kg) AND YIELD (kg/tree) OF MAIN PERENIAL CROPS - 1988												
	Sweet Lemon			Lemon			Mandarin			Orange			Others
	No.	Production	Yield	No.	Production	Yield	No.	Production	Yield	No.	Production	Yield	No. of Tree
HW1:							858	9,106	10.6	987	4,163	4.3	316
HW2:							444	8,190	18.4	504	14,622	29.0	591
HW3:	9	121	13.4				2,625	33,429	12.7	3,044	45,151	14.8	205
Sub-total	9	121	13.4				3,927	50,725	12.9	4,515	63,936	14.2	1,112
HW1	133	313	2.4				5,159	62,498	12.1	8,355	109,723	13.1	550
HW2	30	436	14.5				15,427	163,557	10.6	14,245	198,944	14.0	75
HW3	486	8,053	16.6	969	5,721	5.9	45,199	977,478	21.6	36,307	864,171	23.8	1,275
HW4	199	2,840	14.3				7,697	77,472	10.1	9,785	140,220	14.3	142
HW5	88	3,475	40.4				6,702	71,757	10.7	14,645	198,865	13.6	252
HW6	3,585	8,483	2.4	12	161	13.4	6,208	94,313	15.2	12,610	281,258	22.3	4,311
Sub-total	4,519	23,600	5.2	981	5,882	6.0	86,390	1,447,075	16.8	95,947	1,793,181	18.7	6,605
Total of HW	4,528	23,721	5.2	981	5,882	6.0	90,317	1,497,800	16.6	100,462	1,857,117	18.5	7,717
KL1	3	41	13.7	9	80	8.9	553	4,590	8.3	558	7,455	13.4	
KL2	7	111	15.9	1			694	3,635	5.2	430	2,575	6.0	19
KL3	882	9,741	11.0	147	1,148	7.8	8,251	77,321	9.4	13,157	133,032	10.1	2,614
KL4	796	10,165	12.8	19	234	12.3	8,713	89,899	10.3	10,317	316,021	30.6	324
KL5	846	16,264	19.2	18	980	54.4	8,000	89,159	11.1	12,659	182,002	14.4	2,158
KL6	559	8,588	15.4	36	732	20.3	4,946	64,972	13.1	10,833	158,598	14.6	2,240
Sub-total	3,093	44,920	14.5	230	3,174	13.8	31,157	329,576	10.6	47,954	799,683	16.7	7,353
KR2	13	292	22.5				6,609	81,534	12.3	2,021	20,961	10.4	4
KR3	103	1,349	13.1	18	96	5.3	3,164	21,841	6.9	4,331	44,601	10.3	229
KR4	529	11,183	21.1	84	134	1.6	8,463	65,853	10.2	8,630	92,438	10.7	848
KR5	277	4,023	14.5	10	321	32.1	3,175	38,353	12.1	3,857	63,889	16.6	534
Sub-total	922	16,847	18.3	112	551	4.9	19,411	207,561	10.7	18,839	221,869	11.8	1,615
HE1	397	5,831	14.7	24	502	20.9	11,325	132,429	11.7	13,595	134,235	9.9	7,328
HE2	116	2,905	25.0	10	171	17.1	4,478	24,164	5.4	5,808	42,147	7.3	4,804
HE3	390	6,796	17.4	66	955	14.5	8,345	106,531	12.8	13,631	196,906	14.4	1,082
HE4	301	4,400	14.6	24	262	10.9	6,630	117,447	17.7	8,517	148,684	17.5	1,105
HE5	336	4,709	14.0	77	454	5.9	6,794	56,578	8.3	7,995	91,753	11.5	1,690
Sub-total	1,540	24,641	16.0	201	2,344	11.7	37,572	437,149	11.6	49,546	613,725	12.4	16,009
Total of HE, KL, KR	5,555	86,408	15.6	543	6,069	11.2	88,140	974,308	11.1	116,339	1,635,297	14.1	24,977
AE1	44	863	19.6				1,034	11,960	11.6	2,185	28,637	13.2	803
AE2	188	3,459	18.4	5	95	19.0	1,244	11,642	9.4	3,115	37,487	12.0	193
AE3	436	7,380	16.9	84	427	5.1	8,631	108,112	12.3	17,780	227,981	12.8	1,838
AE4	123	2,043	16.6	8	112	14.0	6,412	63,258	9.9	7,631	102,737	13.5	1,110
AE5	182	2,993	16.4	36	244	6.8	6,288	139,960	22.3	9,446	223,643	23.7	264
AE6	276	5,222	18.9	15	53	3.5	4,081	64,210	15.7	5,055	105,231	20.8	299
AE7	418	4,588	11.0	24	182	6.8	4,852	41,464	8.5	6,600	86,956	13.2	1,801
AE8	106	1,083	10.2	22	165	7.5	1,227	8,148	6.6	1,655	15,724	9.5	195
AE9	831	13,181	15.9	6	55	9.2	4,677	61,855	13.2	9,934	190,659	19.2	1,838
AE10	193	2,617	13.6	3	20	6.7	2,844	40,973	14.4	5,515	84,597	15.3	341
AE11	534	6,884	12.5	267	2,547	9.5	23,398	397,067	17.0	24,209	544,683	22.5	1,765
Sub-total	3,331	50,113	15.0	470	3,880	8.3	64,688	946,649	14.6	93,105	1,648,315	17.7	10,453
AW1							249	4,659	18.7	285	5,260	18.5	
AW2	5	100	20.0				99	1,855	18.7	480	15,329	31.9	182
AW3	48	708	14.8	4	31	7.8	4,151	60,483	14.8	5,468	116,973	21.4	124
AW4	208	2,328	11.2	8	93	11.6	2,461	31,226	12.7	5,375	82,660	15.4	31
AW5	57	578	10.1	20	60	3.0	2,315	28,623	12.4	4,889	74,916	15.3	768
AW6	54	1,196	22.1	7	154	22.0	2,446	41,477	17.0	4,955	145,228	29.3	106
AW7	39	217	5.6				3,024	36,173	12.0	4,827	79,290	17.1	335
AW8	254	4,276	16.8	16	422	26.4	5,677	93,917	16.5	9,614	189,305	19.7	1,518
AW9	1,367	36,077	26.4	57	1,397	24.5	21,467	308,655	14.4	55,086	771,218	14.0	2,608
Sub-total	2,032	45,478	22.4	112	2,157	19.3	41,889	607,068	14.5	90,777	1,480,179	18.3	5,670
AU	288	3,911	13.6	1	30	30.0	7,605	106,374	14.0	12,404	173,315	14.0	542
BU	91	1,808	17.7	138	507	3.7	2,144	55,536	25.9	2,228	41,380	18.6	36
GRAND TOTAL	15,825	211,239	13.3	2,245	18,525	8.3	294,783	4,187,733	14.2	415,315	6,835,603	16.5	49,395

TABLE C.2-4 CROPPING AREA AND YIELD/HA OF PADDY IN EX-AMOL SHAHRESTAN BY VARIETIES SINCE 1984/85

VARIETY	1984/85		1985/86		1986/87		1987/88		1988/89		1989/90		1990/91		1992-estimated									
	AREA ha	RATIO %	YIELD kg	AREA ha	RATIO %	YIELD kg	AREA ha	RATIO %	YIELD kg	AREA ha	RATIO %	YIELD kg	AREA ha	RATIO %	YIELD kg	AREA ha	RATIO %							
TAROH	22,550	41.0	4,800	24,000	43.6	4,100	17,000	29.3	4,450	29,000	48.3	3,440	18,440	29.5	4,968	29,227	46.8	4,106	28,357	42.2	5,030	35,000	60.3	3,500
KHAZAR	0	0	0	0	0	0	350	0.6	2,200	1,600	2.7	4,230	6,751	10.8	5,391	8,290	13.3	5,542	11,914	19.1	5,700	7,000	12.1	5,000
GRDEH*	2,400	4.4	3,800	500	0.9	6,500	320	0.6	2,300	300	0.5	5,100	1,403	2.2	6,916	1,645	4.2	6,450	1,489	2.4	6,500	600	1.0	5,500
HARAZ	0	0	0	4,000	7.3	7,600	11,000	19.0	6,900	4,790	8.0	4,830	8,030	12.8	7,202	7,135	11.4	7,585	2,175	3.5	6,970	4,000	6.9	6,500
TAROH ASGHARI	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,178	1.9	6,280	11,039	17.7	6,060	3,500	6.0	5,000
SEFID RUD	0	0	0	0	0	0	0	0	0	0	0	0	870	1.4	6,950	5,290	8.5	7,435	2,529	4.0	7,280	3,000	5.2	6,500
ANOL-3	18,150	33.0	8,100	22,000	40.0	7,900	25,000	43.1	7,050	15,080	25.1	5,510	21,621	34.6	7,898	7,646	12.2	8,144	3,097	5.0	6,590	2,500	4.3	8,000
HESBAH	1,650	3.0	6,500	300	0.9	6,000	700	1.2	5,850	1,370	2.3	4,300	1,314	2.1	6,216	89	0.1	6,300	238	0.4	5,510	600	1.0	5,500
BINAH	1,250	2.3	1,800	700	1.3	1,800	600	1.0	1,790	580	1.0	1,750	88	0.1	5,729	1,000	1.6	4,500	238	0.4	4,710	600	1.0	3,000
SHASTAK HALEKI	1,250	2.3	1,800	700	1.3	1,600	700	1.2	1,700	580	1.0	1,750	0	0	0	111	0.2	5,500	1,371	2.2	3,670	600	1.0	3,500
AB KEMAR	1,350	2.5	1,800	600	1.1	1,500	700	1.2	1,400	0	0	0	482	0.7	4,620	0	0	0	118	0.2	3,020	0	0	3,500
RASHTI	4,400	8.0	4,500	2,000	3.6	4,200	1,300	2.2	4,490	6,700	11.2	3,950	3,091	4.9	5,100	889	1.4	3,830	588	0.9	5,240	0	0	4,500
SHABANJO	0	0	0	0	0	0	0	0	0	0	0	0	426	0.7	6,190	0	0	0	1,371	2.2	4,010	600	1.0	0
ANOL-2	0	0	0	0	0	0	330	0.6	2,290	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CHAPPA*	2,000	3.5	3,500	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	55,000			55,000		58,000		60,000		62,500		62,500		62,500		62,500		62,500		62,500		58,000		58,000

* Short grain rice

TABLE C.2-5 DATA ON MID-SUMMER DRYING EFFECTS

VARIETY : AMOL - 3

YEAR : 1984 - 1986

SPACING : 25 X 25 cm / hill

period			paddy	straw	number of	number of	length of	unfilled	1000grain	plant
TL	MAX	HD	yield ton	yield ton	tiller/hil	grain/pani	panicle	grain %	weight gr	height cm
X	X	-	8.450	14.023	40.8	208.8	26.6	15.0	28.4	93.3
X	-	X	7.528	11.465	39.8	187.0	24.4	24.3	26.8	87.1
-	X	X	7.368	11.110	31.3	170.5	24.9	20.8	26.2	89.8
X	-	-	8.370	14.438	40.3	204.0	26.8	11.3	28.3	91.1
-	-	X	7.275	11.350	29.0	179.3	24.1	26.5	25.5	86.3
-	X	-	7.957	11.988	34.8	189.2	25.4	20.8	26.8	87.5
X	X	X	8.145	12.905	39.8	195.5	26.0	16.0	28.2	93.2
-	-	-	8.250	13.425	39.3	199.5	26.6	16.3	27.7	93.9
average			7.918	12.588	36.9	191.7	25.6	18.9	27.2	90.3
X	X	-	8.744	14.375	35.3	211.0	27.7	9.5	28.6	-
X	-	X	7.213	12.600	31.3	198.0	26.1	22.3	26.6	-
-	X	X	6.794	12.625	23.0	179.0	25.3	21.3	26.7	-
X	-	-	9.127	14.250	34.0	213.0	27.7	9.5	28.7	-
-	-	X	6.644	11.575	23.0	175.0	24.6	23.5	26.8	-
-	X	-	8.040	13.225	25.8	203.0	27.1	11.2	28.1	-
X	X	X	7.151	13.800	29.3	203.0	26.3	19.2	26.7	-
-	-	-	7.669	13.540	24.5	186.0	26.7	11.5	27.5	-
average			7.673	13.249	28.3	196.0	26.4	16.0	27.5	-
X	X	-	8.650	-	34.0	211.0	27.1	10.0	28.6	98.8
X	-	X	6.815	-	31.3	192.0	26.3	21.8	26.6	91.5
-	X	X	6.745	-	30.5	176.0	25.8	20.7	26.1	86.5
X	-	-	7.503	-	33.3	208.0	27.5	10.8	28.5	96.5
-	-	X	6.193	-	24.5	166.0	24.7	24.0	26.3	82.8
-	X	-	8.295	-	30.5	199.0	26.5	10.1	28.0	83.3
X	X	X	8.268	-	33.0	194.0	26.6	19.8	26.3	98.0
-	-	-	7.412	-	24.5	183.0	26.5	10.8	27.7	92.8
average			7.485	-	30.200	191.125	26.375	16.000	27.263	91.275

Note : period of drying TL; tillering Max; Maximm tillering HD; heading stages
 figures in the upper part for 1984, in the middle for 1985 and in the lower for 1986

average of no drying (control)	7.777	100.0%	at tillering only	8.333	107.2%
average of drying at tillering	7.997	102.8%	at max. til' only	8.097	104.1%
d.o. drying at max. tillering	7.884	101.4%	at heading only	6.704	86.2%
d.o. drying at heading stage	7.245	93.2%	mean at tillering	8.215	105.6%
average of total without control	7.680	98.7%			

From the results given above, yield increase by mid-summer drainage is estimated at 105.6 % excluding those at heading stage which give detrimental root cutting effect to paddy plant

TABLE C.2 - 6 DATA ON DENSITY SPACING OF PADDY PLANTING

VARIETY: Line 6931 (HYV) YEAR: 1991- 92 TREATMENT:TRIPLICATE						
Spacing	No.ofhill/m ²	Yield (kg/ha)	Tillers/m ²	Height (plant cm)	Urea kg/ha	DAPkg/ha
1991 Results						
15cm x 15cm	44.4	6,427	8.0	102.3	200	100
20cm x 20cm	25.0	6,463	10.6	113.6	200	100
25cm x 25cm	16.0	7,073	15.0	114.3	200	100
30cm x 30cm	11.1	6,724	18.0	115.6	200	100
15cm x 15cm	44.4	7,082	8.0	117.7	250	100
20cm x 20cm	25.0	7,642	12.0	113.0	250	100
25cm x 25cm	16.0	6,650	15.6	118.0	250	100
30cm x 30cm	11.1	5,652	17.0	117.0	250	100
15cm x 15cm	44.4	7,551	8.0	118.6	300	100
20cm x 20cm	25.0	7,280	13.0	115.6	300	100
25cm x 25cm	16.0	7,005	14.0	124.0	300	100
30cm x 30cm	11.1	5,087	17.0	124.0	300	100
15cm x 15cm	44.4	7,601	9.0	116.6	350	100
20cm x 20cm	25.0	7,024	12.0	123.0	350	100
25cm x 25cm	16.0	6,684	15.0	127.6	350	100
30cm x 30cm	11.1	6,577	19.0	133.0	350	100
15cm x 15cm	44.4	Average of 1991 7,165	8.3	113.8	275	100
20cm x 20cm	25.0	7,102	11.9	116.3	275	100
25cm x 25cm	16.0	6,853	14.9	121.0	275	100
30cm x 30cm	11.1	6,010	17.8	122.4	275	100
1992 Results						
15cm x 15cm	44.4	7,047	6.9	125.6	200	100
20cm x 20cm	25.0	6,209	9.5	123.3	200	100
25cm x 25cm	16.0	6,120	13.7	124.8	200	100
30cm x 30cm	11.1	6,113	14.8	131.6	200	100
15cm x 15cm	44.4	6,969	7.7	120.0	250	100
20cm x 20cm	25.0	6,986	10.6	123.8	250	100
25cm x 25cm	16.0	7,306	14.2	137.4	250	100
30cm x 30cm	11.1	6,304	16.2	137.6	250	100
15cm x 15cm	44.4	6,508	6.9	123.5	300	100
20cm x 20cm	25.0	6,395	9.7	125.6	300	100
25cm x 25cm	16.0	6,269	14.6	135.6	300	100
30cm x 30cm	11.1	6,548	18.3	136.1	300	100
15cm x 15cm	44.4	6,535	7.8	123.9	350	100
20cm x 20cm	25.0	7,137	9.5	134.3	350	100
25cm x 25cm	16.0	7,872	15.1	137.7	350	100
30cm x 30cm	11.1	6,512	18.2	138.2	350	100
15cm x 15cm	44.4	Average of 1992 6,765	7.3	123.3	275	100
20cm x 20cm	25.0	6,682	9.8	126.8	275	100
25cm x 25cm	16.0	6,892	14.4	133.9	275	100
30cm x 30cm	11.1	6,369	16.9	135.9	275	100

Source : By the courtesy of Mr.Eshraghi and Mr. Babapur

Quadratic Regression Equations with Yield(Y) and Density(D)

$Y = aD^2 + bD + c$ and $S(\) : \text{Sigma}$ where
 $a = X/Z$ $X = S(D2)S(D2Y) - S(D3)S(DY) - S(Y)S(D2)S(D2)/4$
 $Z = S(D2)S(D4) - S(D3)S(D3) - S(D2)S(D2)S(D2)/4$
 $b = U/V$ $U = S(D2Y) - S(Y)S(D2)/4 + a\{S(D2)S(D2)/4 - S(D4)\}$
 $V = V = S(D3)$ where: $D2 = D*D$, $D3 = D*D*D$, $D4 = D2*D2$
 No. of hill = d, mean of d = m, then $D = d - m$, $m = 24.125$
 $S(D2) = 650.12$ $S(D3) = 5586.63$ $S(D4) = 203573.50$
 for 1991, $S(DY) = 17393.38$ $S(D2Y) = 4422991.3$ $S(Y) = 27130.5$
 $X = -88412576$ $Z = 32442487$ $a = X/Z = -2.73$
 $U = 280764.02$ $V = 5586.63$ $b = U/V = 50.26$
 $c = 7132.20 = 6010 - (-2.73*(11.1-24.125)^2 + 50.26*(11.1-24.125))$
 $Y = -2.73(D-24.125)^2 + 50.26(D-24.125) + 7132.20$
 that is : $Y = -2.73D^2 + 181.98D + 4330.78$ $\text{Max-}b/2a = 33.33$
 $33.33 \text{ equiv. to } 17.32\text{cm} \times 17.32\text{cm}$ present 16hls/m^2 $25\text{cm} \times 25\text{cm}$
 Expected rate of Yield Improvement $Y(D=33.33) / Y(D=25) = 1.03$

for 1992, $S(DY) = 3913.35$ $S(D2Y) = 4321534.9$ $S(Y) = 26707.5$
 $X = -34367496$ $Z = 32442487$ $a = X/Z = -1.06$
 $U = 248057.92$ $V = 5586.63$ $b = U/V = 44.40$
 $c = 7131.97 = 6369 - (-1.06*(11.1-24.125)^2 + 44.40*(11.1-24.125))$
 $Y = -1.06(D-24.125)^2 + 44.40(D-24.125) + 7131.97$
 that is : $Y = -1.06D^2 + 95.55D + 5443.88$ $\text{Max-}b/2a = 45.07$
 $\text{equiv. to } 14.9\text{cm} \times 14.9\text{cm}$ present 16hls/m^2 25sq. cm
 Expected rate of Yield Improvement $Y(D=45.07) / Y(D=25) = 1.06$

Average rate of Yield Improvement by proper spacing is
 estimated at: $(1.03 + 1.06)/2 = 1.045$ for HYV.

TABLE C.2-7 NUMBER OF SEEDLINGS PER HILL AND CORRESPONDING YIELDS

variety	number of seedlings per hill	number of hills per sq. meter	number of max tiller / hill	effective tillerings %	no. of matured grain / panicle	number of panicles per hill	matured grain %	weight of 1000 grains gr	paddy yield ton /ha
TAROM early var.	3 - 4	23.81	13.90	91.37	107.12	12.70	94.63	22.7	4.773
		20.83	16.80	80.95	74.44	13.60	96.36	23.8	4.847
	5 - 6	23.81	13.10	98.47	80.83	12.90	92.11	22.9	4.612
		20.83	17.60	86.36	77.06	15.20	93.91	22.0	4.782
KHAZAR medium var.	3 - 4	23.81	17.40	52.07	112.00	10.80	82.66	25.3	6.641
		20.83	22.20	57.66	133.92	12.80	79.99	25.2	5.913
	5 - 6	23.81	22.80	52.63	99.45	12.00	83.57	25.2	5.935
		20.83	22.00	56.36	175.57	12.40	90.23	25.6	6.310
AMOL-3 late var.	3 - 4	20.83	26.52	61.35	158.88	16.27	78.00	26.2	8.905
		18.52	32.70	54.26	156.19	17.41	76.69	25.9	8.883
	5 - 6	20.83	28.83	59.19	163.87	17.13	77.55	26.1	9.001
		18.52	30.64	58.28	143.98	17.78	76.29	26.1	8.644

Expected Yield Improving Effect by Number of Seedlings per Hill

Maturity-Variety	Estimated from Yield		Estimated from Components		Averages
	%	ton/ha	hill-weight %	ton/ha yield.equiv	
early - varieties	3.5%	0.161	29.3%	1.668	2.4%
(local)	1.4%	0.065	-6.5%	-0.349	
medium -varieties	11.9%	0.706	1.8%	0.126	2.8%
(H.Y.V.)	-6.3%	-0.397	-22.5%	-2.611	
late - varieties	-1.1%	-0.096	-7.6%	-1.154	0.8%
(H.Y.V.)	2.8%	0.239	5.4%	0.669	

As to the effect of land consolidation preventing loss of applied fertilizers flown away out of the applied fields by overflow irrigation systems, no data exists in the project area, and therefore it should be estimated from a theory of partition. Response characteristics to chemical fertilizers can be derived from Then, the yield loss is to be derived from the estimated amount of fertilizers lost from the applied field. Yield increment per kg. of urea is thus given by (1991) 1.747 kg.paddy / kg. urea applied/ha (1992) 2.928

On the other hand, the amount of water overflow from 1 ha of paddy plot can be estimated from water quantity reused and precipitated during cropping. Basic data available to the estimation are : full depth of waterlogging over paddy field ; 150 mm. number of days from transplanting to milk ripening ; 100 days , amount of reuse water ; 116 MCM/year, amount of rainfall during this period ; 102 mm. mean water percolation rate per diem (duty) ; 6.9 mm. necessity of covering five folds of the are as much as its own to feed water as passage is assumed for calculation Then,

estimated quantity flowing out of a plot of 1 ha ; load of rain drainage + disposal of reuse water + delivering water to lower lying plots minus own consumption = $102 \text{ mm}/100 + 116\text{MCM}/100/32200 + (6.9 \times 5 - 6.9)\text{mm} = 28.8 \text{ mm/day}$. equivalent to 19.2 % of the filled water volime, but it takes for applied urea (130 ppm) to be adsorbed by paddy soil around 5 days after application. Taking this into account, possible loss into overflow water can be estimated as : $0.192(1 + 0.8 \times 0.808 + 0.6 \times 0.653 + 0.6 \times 0.89 + 0.4 \times 0.84 + 0.2 \times 0.80) = 0.448$ equivalent to 89.6 kg of urea. So, the estimated yield loss comes to $89.6 \times (1.7 + 2.9)/2 = 206 \text{ kg}$, or 5.2 % of the current yield for local variety, but only 3.8 % for medium and 2.8 % for late H.Y.V. However, even with project all local varieties are not necessarily receive top dressing hence a half of the estimated effect will be applied to.

TABLE C. 3 - 1 POPULATION OF CATTLE & SHEEP/GOAT IN TOTAL SHAHRESTAN & PROJECT AREA

	TOTAL SHAHRESTAN		PROJECT AREA	
	Cattle	Sheep/Goat	Cattle	Sheep/Goat
AMOL SHAHRESTAN:				
Chalav*	1,775	5,694	1,600	1,000
Bala Khiaban Latikuh*	16,337	46,368	4,040	7,200
Poin khiaban Latikuh	5,385	14,450	5,385	14,450
Dasht Sar	15,018	15,181	8,892	5,586
Dabu Junubi	9,318	1,478	9,318	1,478
Harazpei Junubi	4,336	4,448	4,336	4,448
Ahlamrostagh	6,985	870	22,062	3,510
Harazpei Shomali	4,160	1,817	4,160	1,817
Dabu Shomali	6,737	53	6,737	53
SUB-TOTAL	70,051	90,359	66,530	39,542
OTHER DEHSTANS	6,307	44,934		
TOTAL	76,358	135,293		
BABOLSAR SHAHRESTAN:				
Emamzadeh Abudallah	2,580	406	2,580	406
Barik Rud	2,782	4,980	2,782	4,980
Rud Bast	7,140	6,115	2,943	745
SUB-TOTAL	12,502	11,501	8,305	6,131
OTHER DEHSTANS	4,397	9,290		
TOTAL	16,899	20,791		
BABOL SHAHRESTAN:				
Lalehabad	9,867	11,611	8,432	6,806
Karipei	11,067	456	11,067	456
SUB-TOTAL	20,934	12,067	19,499	7,262
OTHER DEHSTANS	91,535	112,641		
TOTAL	112,469	124,708		
NUR SHAHRESTAN:				
			1,400	0
TOTAL PROJECT AREA			95,734	52,935
TOTAL SHAHRESTAN	205,726	280,792		

- Notes: (1) The Dehstans are newly rearranged, therefore the data are also rearranged accordingly, except
(2) Chalav and Bala Khiaban Latikuh whose data are not rearranged according to new administration boundary.

TABLE C.3 - 2 LIVESTOCK POPULATION IN THE PROJECT AREA BY DEHSTANS

REFERENCE CODES	LIVESTOCK POPULATION IN 1988							POULTRY POPULATION IN 1985									
	Cattle			Total	Sheep	Goat	Horse	Ass & Mule	Chicken		Duck	Goose	Turkey	Bee (box)			
	Local	Hybrid	Pure						Local	Industry							
Dehstan																	
AU	60	20		80	277					50	10	2					
DN001	586	35	45	666	2,248	248	40	7	1,550	11,000	800	460	30	300			
DN002	3,654	783	23	4,460	4,684	174	56	5	8,150	210,400	5,160	1,380	130	765			
DN003	4,508	401	59	4,968	6,641	791	28	60	15,970	66,000	10,535	3,150	170	397			
DN004	6,127	1,461	592	8,180	6,800	787	99		25,020	382,500	17,584	6,888	1,201	242			
DN005	5,936	867	238	7,041	1,885	163	4		80,248	240,000	63,160	10,126	2,599	152			
DN006	3,714	597	237	4,548	4,042	175	9		24,485	145,500	18,614	6,196	1,396				
DN007	2,924	304	223	3,451	1,379	292	10		27,490	67,000	34,560	7,390	439	46			
DN008	2,538	508	142	3,188	360	278			28,071	30,000	27,100	5,910	370	47			
DN009	2,070	166	142	2,378	533	4			28,870		31,950	4,880	210	160			
Sub-total	32,117	5,142	1,701	38,960	28,849	2,912	246	72	219,904	1,152,400	208,973	46,382	6,545	2,109			
DN010	1,274	131	12	1,417	144	10	19		25,660		21,460	5,915	137	62			
DN011	842	377	209	1,428	2,409	28	12		10,960	9,000	8,860	2,850	115	160			
DN012	752	269	122	1,143	439	7	2		13,150	5,000	6,437	1,391	76				
Sub-total	2,868	777	343	3,988	2,992	45	33		49,760	14,000	36,757	10,156	328	222			
BU	182	40	10	232	312	20	3		900		400	120					
DN013	2,956	946	322	4,224	3,984	95	26	2	39,254	5,000	32,761	9,559	2,444	18			
DN014	3,298	1,454	271	5,023	846	27	4		43,819	69,350	94,170	10,655	918	126			
Sub-total	6,436	2,440	603	9,479	5,142	142	33	2	83,973	74,350	127,331	20,334	3,362	144			
TOTAL	41,421	8,359	2,647	52,427	36,983	3,099	312	74	353,637	1,240,750	372,961	76,872	10,235	2,475			

TABLE C.3-3 LIVESTOCK POPULATION IN THE PROJECT AREA BY IRRIGATION ZONES

REFERENCE CODES	LIVESTOCK POPULATION IN 1988				POULTRY POPULATION IN 1985										
	Cattle				Sheep	Goat	Horse	Ass & Mule	Chicken					Turkey	Bee (box)
	Local	Hybrid	Pure	Total					Local	Industry	Duck	Goose			
HFU1	337	25	45	407	1,714	235	30	4	1,000	4,000	600	300	30	100	
HFU2	249	10		259	534	13	10	3	550	7,000	200	160		200	
HFU3	235	52		287	353	5	10		700	3,000	400	300	30	200	
Sub-total	821	87	45	953	2,601	253	50	7	2,250	14,000	1,200	760	60	500	
HF1	857	57	3	917	309	18	3		900	26,400	950	200	50	470	
HF2	2,703	174	41	2,918	3,050	220	5		6,720	78,000	5,335	1,620	24	209	
HF3	3,225	808	12	4,045	4,623	171	44	5	12,620	167,000	6,150	1,710	156	90	
HF4	904	116	83	1,103	1,390	270	23		4,540		11,720	1,405	75	3	
HF5	502	75	28	605	597	6			4,100	20,000	3,760	1,110	242		
HF6	611	68	18	697	127	2			4,290	19,500	3,400	1,730	275		
Sub-total	8,802	1,298	185	10,285	10,096	687	75	5	33,170	310,900	31,315	7,775	822	772	
Total of HF	9,623	1,385	230	11,238	12,697	940	125	12	35,420	324,900	32,515	8,535	882	1,272	
KL1	133	25		158	173	15	3		240		113	151	10	22	
KL2	46	29	18	84	155		3		800	6,000	800	300	40		
KL3	1,464	377	50	1,891	210	5	4		21,640	5,000	31,960	5,345	593		
KL4	1,130	491	89	1,710	54	4			13,684	13,000	14,830	3,632	379		
KL5	673	409	182	1,264	460	24	1		4,295	30,000	5,637	745	10	24	
KL6	445	405	128	978	220	1		2	6,480		3,320	790	70	11	
Sub-total	3,891	1,727	487	6,085	1,272	49	11	2	47,049	54,000	56,480	10,963	1,102	57	
KR2	275	29	18	322	804	93	6		100		40	20			
KR3	1,442	163	44	1,649	536	90	35		6,100	41,000	3,990	1,511	137		
KR4	1,124	256	54	1,434	2,904	64	21		10,819		8,821	3,370	626	7	
KR5	454	280	67	801	791	26	5		14,260		6,160	2,967	1,660		
Sub-total	3,295	728	193	4,206	5,035	273	67		31,279	41,000	19,011	7,668	2,423	7	
HE1	2,528	565	279	3,373	2,541	244	40		10,840	347,000	10,024	3,660	749	80	
HE2	603	168	2	771	858	43	1		4,240	198,000	2,735	830	162	50	
HE3	1,261	264	81	1,606	1,966	187	15		19,370	45,000	7,465	1,492	620	232	
HE4	1,208	197	57	1,462	1,174	195		60	7,470	12,000	6,756	1,800	292	10	
HE5	1,040	341	55	1,436	588	75	5		3,250	18,850	48,486	2,516	175		
Sub-total	6,640	1,534	474	8,648	7,107	744	61	60	51,170	620,850	75,466	10,298	1,988	372	
Total of HE, KL, KR	13,826	3,989	1,124	18,939	13,414	1,066	139	62	129,498	715,850	150,957	29,129	5,523	436	
AE1	445	93	12	550	180				2,000		2,100	300	60		
AE2	453	72	20	545	82	3			3,200		3,350	550	30		
AE3	1,983	158	61	2,202	400				21,480		27,095	3,640	334	160	
AE4	673	92	38	803	112		4		21,880		23,200	5,152	180	60	
AE5	1,363	103	55	1,521	399	75			9,512		15,184	1,751	623		
AE6	924	73	2	999	12	6			8,496		9,900	1,666	340		
AE7	868	141	10	1,019	47	1	15		8,590	9,000	9,370	1,540	420	102	
AE8	224	44	3	271	3	3			1,640		1,800	750	15		
AE9	684	83	3	770	23	4			6,765	5,000	8,010	1,780	14	2	
AE10	486	70	65	621	14				2,950	26,000	3,700	650	30		
AE11	966	487	280	1,733	2,810	26	14		15,260		6,330	2,646	166	180	
Sub-total	9,069	1,416	549	11,034	4,082	118	33		101,773	40,000	110,039	20,425	2,212	484	
AF1	188	26	6	200			1		4,200		3,900	1,100			
AF2	204	16		220	3		5		1,550		1,030	250	10		
AF3	467	43	70	580	4				7,850	21,000	8,980	1,910	24	40	
AF4	555	47	12	614	12		1		5,500	22,000	4,350	1,300	90	6	
AF5	1,315	87	27	1,429	1,054	266			6,781		7,250	1,820	8		
AF6	631	61	50	742	54	4			3,940		4,660	1,435	85		
AF7	1,117	182	75	1,374	263	203			10,210	38,000	10,250	3,660	947	17	
AF8	601	175	80	856	1,492	73	1		3,065	45,000	1,420	471	22		
AF9	2,088	467	200	2,755	598	9			33,350		32,050	5,040	322	30	
Sub-total	7,146	1,104	520	8,770	3,480	557	8		76,446	126,000	73,890	16,986	1,508	93	
AU	1,539	420	214	2,173	2,795	395	4		8,500	34,000	3,160	1,477	80	190	
BV	218	45	10	273	515	23	3		2,000		2,400	320	20		
GRAND TOTAL	41,421	8,359	2,647	52,427	39,983	3,099	312	74	353,637	1,240,750	372,961	76,872	10,235	2,475	

TABLE C. 3 - 4 BASIC FACTORS FOR LIVESTOCK FARMING

(1) Standard Daily Ration (kg/day/head)

		Spring-Summer		Autumn-Winter	
		DCP	TDN	DCP	TDN
Local Cow	Adult	0.54	3.17	0.75	3.09
	Heifer	0.35	2.25	0.52	2.12
	Calf	0.30	1.74	0.34	1.61
Hybrid Race	Adult	1.04	6.35	1.37	6.43
	Heifer	0.64	3.74	0.87	3.64
	Calf	0.38	2.23	0.46	2.15
Pure Race	Adult	1.38	8.01	1.72	7.93
	Heifer	0.73	4.24	1.04	4.26
	Calf	0.43	2.48	0.50	2.48

(2) Herd Composition of Livestock by Varieties (100 heads per herd)

	Adult	Heifer	Calf
Local Cow	64	25	11
Hybrid Race	40	36	24
Pure Race	30	41	29
Sheep	58		42
Goat	62		38

(3) Annual Ration per Herd

	Spring-Summer		Autumn-Winter		Annual Total	
	DCP	TDN	DCP	TDN	DCP	TDN
Local Cow	8,530	50,923	11,783	48,862	20,312	99,507
Hybrid Race	13,498	80,915	17,683	80,051	31,181	160,966
Pure Race	15,335	88,949	19,791	88,175	35,126	177,124
Sheep	-	-	-	-	2,116	10,582
Goat	-	-	-	-	2,310	13,178

(4) Nutrition Content by Available Feed Sources

	DCP	TDN	Yield/ha	Production/ha	
				DCP	TDN
Rice Straw	0.6%	17.9%	4,300kg	26kg	770kg
Wild Grass*	0.9	12.0	1,350	12	162
Berseem	2.1	12.1	60,000**	1,260	7,260

* Including harvested paddy field in Winter.

** Yield of Berseem at present is about a half because farmer is used to grazing cattle in the berseem farm to save the harvesting work load.

TABLE C.3-5 PRESENT LIVESTOCK FARMING

(1) Nutrition Requirement

		No. of Herd	DCP	TDN
Local Cow	Whole year	410	8,327,920kg	40,797,870kg
	Winter only	437	5,149,171	21,352,694
Hybrid Race	Whole year	84	2,619,204	13,521,144
Pure Race	Whole year	26	913,276	4,605,224
Sub-total			17,009,571	80,276,932
Sheep	Whole year	370	782,920	3,915,340
	Winter only	118	124,844	624,338
Goat	Whole year	30	69,300	395,340
	Winter only	11	12,705	72,479
Sub-total			989,769	5,007,497
Total			17,999,340kg	85,284,429kg

(2) Nutrition Availability

		DCP	TDN
Rice Straw	82,800ha x 0.8	1,722,240kg	51,004,800kg
Wild Grass*	82,800 x 0.6	596,160	8,048,160
Berseem	4,000 x 0.5	2,520,000	14,520,000
Total		4,838,400kg	73,572,960kg

(3) Nutrition Balance

-13,160,940kg -11,711,469kg

(4) Supply Ratio

26.9% 86.3%

TABLE C.3-6 PLANNED LIVESTOCK FARMING

(1) Nutrition Availability

	Nutrition Resources	DCP	TDN
Rice Straw	75,985ha x 4.3t x 0.6 = 196,041t	1,176t	35,091t
Berseem	50,384ha x 60t x 0.7 = 2,116,128t	44,438	256,051
Total		45,614t	291,142t

(2) Feeding Plan (DCP Basis)

Case A: Increase of Milch Cow

	No. of Herd	DCP	TDN
Local Cow	847	17,204t	84,282t
Hybrid Race	592	18,459	95,292
Pure Race	251	8,817	44,458
Sheep	488	1,033	5,164
Goat	41	95	540
Total		45,608t	229,736t

Case B: Proportional Increase of Cow

Local Cow	1,811	36,785	180,207
Hybrid Race	183	5,706	29,457
Pure Race	56	1,967	9,919
Sheep	488	1,033	5,164
Goat	41	95	540
Total		45,586t	225,287t

Case C: Increase of Meat Cow & Sheep

Local Cow	1,949	39,588	193,939
Hybrid Race	84	2,619	13,521
Pure Race	26	913	4,605
Sheep	1,130	2,391	11,958
Goat	41	95	540
Total		45,606t	224,563t

TABLE C.3-7 ESTIMATED PRODUCTION UNDER THE PROJECT

	Local Cow		Hybrid Race		Pure Race		Sheep		Goat	
	Unit	Yield/Unit	Unit	Yield/Unit	Unit	Yield/Unit	Unit	Yield/Unit	Unit	Yield/Unit
Milk	1	420	1	1,875	1	3,655	-	-	-	-
Meat:										
Culled	0.12	250	0.14	450	0.14	550	0.2	40	0.2	30
Heifer	0.13	175	0.18	240	0.20	380				
Calf	0.25	75	0.36	200	0.40	250	0.5	20	0.2	15
Wool		-		-		-	1	1.5		-

TABLE C.4-1 AVAILABILITY OF AGRI-MACHINERY IN THE PROJECT AREA BY DEHSTANS

REFERENCE CODES	AVAILABILITY OF AGRI-MACHINERY IN 1988					NO. OF THERSIER IN 1985	AVAILABILITY OF WATER RESOURCES IN 1988						
	Tractor	Tiller	Combine	Water Pump	No. of Pumps		Deep Well		Semi-deep Well		Artisan Well	Spring	Farm Pond
							No.	Mean Depth	No.	Mean Depth			
Dehstan													
AU		2		1		1		1	33				
DN001	3	21				8							
DN002	37	317		27		180	5	270	9			5	
DN003	55	1,212		403		530	7	445	331	3		2	2
DN004	44	1,808	5	198		818	4	240	111	3		87	
DN005	20	3,094	8	1,636		1,730	137	242	1,473	39		139	12
DN006	38	1,220	44	309		783	9	110	181	1		79	
DN007	22	2,300	35	1,808		1,107	30	470	593			16	46
DN008	22	1,576		1,402		779	10	410	1,168	2		3	8
DN009	32	1,545	79	485		608	58	375	321			3	12
Sub-total	273	13,095	171	6,269		6,544	260	2,562	4,188	48		341	80
DN010	4	1,392		839		589			520	2		1	30
DN011	34	717		973		323	7	30	652				8
DN012	43	988		1,298		393	101	80	366			1	19
Sub-total	81	3,097		3,110		1,305	108	110	1,538	2		2	57
BU													
	2	70		144		25			144				
DN013	50	1,734	3	1,120		1,061	6	515	837	2		17	5
DN014	17	2,842	90	1,651		1,580	20	460	1,237	8		3	32
Sub-total	69	4,646	93	2,915		2,666	28	975	2,218	11		20	37
TOTAL	423	20,838	264	12,294		10,515	394	3,647	7,944	61		363	174

TABLE C.4-2 AVAILABILITY OF AGRI-MACHINERY IN THE PROJECT AREA BY IRRIGATION ZONES

REFERENCE CODES	AVAILABILITY OF AGRI-MACHINERY IN 1988				NO. OF THRSHER IN 1985	AVAILABILITY OF WATER RESOURCES IN 1988							
	Irrigation zone	Tractor	Tiller	Combine		Water Pump	Deep Well		Semi-deep Well		Artisan Well	Spring	Farm Pond
							No.	Mean Depth	No.	Mean Depth			
HWU1	2	12			7						4		
HWU2	1	9			1						1		
HWU3	7	13		10	9								
Sub-total	10	34		10	17						5		
HW1	1	10		2	27	2	190	1			1		
HW2	33	828		408	301	11	380	359	175	3	49	2	
HW3	41	599		74	249	4	215	42	49		11	2	
HW4	11	350		64	179			45	44		34		
HW5	2	255		22	129	2					6		
HW6	7	206		27	158			6	16		9		
Sub-total	95	2,248		597	1,043	19	785	453	284	3	110	4	
Total of HW	105	2,282		607	1,060	19	785	453	284	3	115	4	
KL1	2	20			15								
KL2	4	50			40								
KL3	10	708	26	80	507	3	230	63	139	8	2		
KL4	2	837	65	353	421			307	127		1	6	
KL5	25	558		346	223	16	60	262	102		1	5	
KL6	21	413		349	221	2	205	228	76			6	
Sub-total	64	2,586	91	1,128	1,427	21	495	858	444	8	4	17	
KR2	1	46		2	2								
KR3	8	319	1	124	111	3	100	104	40				
KR4	14	624	2	616	345	3	320	526	133	1	13	1	
KR5	6	256		191	199	2	120	131	68		3		
Sub-total	29	1,245	3	993	657	8	540	761	241	1	16	1	
HE1	28	779	3	182	370	1	102	134	83		22		
HE2	4	350	4	131	203	28	50	100	10		4	1	
HE3	5	492		9	315			7	12		5		
HE4	3	419		63	250					3	4		
HE5	8	666		35	438	1	100	34	37	2	2		
Sub-total	48	2,706	7	400	1,576	30	252	275	122	5	37	1	
Total of HE, KL, KR	141	6,537	101	2,461	3,660	59	1,287	1,894	807	14	57	19	
AE1	3	182		50	98			35	5		9		
AE2	3	157		63	169			48	41		21		
AE3	13	1,345	70	586	644	85	20	750	120	14	9	11	
AE4	5	1,181	6	702	435	54	170	422	115	6	1	9	
AE5		732	8	417	407	3		307	85	18	102	3	
AE6	2	615		356	331			254	96	3		12	
AE7	6	524		266	243	1	30	205	81			9	
AE8		205		137	128			137	31		1	3	
AE9	2	457		578	267	6		112	19		4	8	
AE10	3	560		560	208			410	40			9	
AE11	56	987		1,623	368	100	20	736	177		1	22	
Sub-total	93	6,915	84	5,398	3,257	249	240	3,416	810	41	144	86	
AW1	6	235		200	175	4	140	125	50			13	
AW2	5	170		140	73			35	52			9	
AW3	3	777		544	375	3	200	128	90		5	13	
AW4	4	343	22	316	172	3	130	120	30		1	2	
AW5	3	449	13	605	240	4	170	575	79		2	5	
AW6	2	401		472	167	22	20	80	19		4	8	
AW7	9	568	40	611	291	1	50	580	92		12		
AW8	9	186	1	31	138	1	40	18	57	1	22		
AW9	37	1,629	3	658	735	26	445	310	243	2	1	12	
Sub-total	78	4,758	79	3,577	2,366	66	1,195	1,971	712	3	47	63	
AU	4	209		42	103	1	140	41	47				
BU	2	137		209	69			169	32			2	
GRAND TOTAL	423	20,838	264	12,294	10,515	394	3,647	7,944	2,692	61	363	174	

TABLE C.4-3 RESULT OF SAMPLE SURVEY OF FARMER'S FAMILY BUDGET IN THE PROJECT AREA

CODE	LAND		CROPPING AREA		FAMILY WORKER		ANNUAL INCOME		ANNUAL LIVING EXPENDITURE				ANNUAL PRODUCTION EXPENDITURE				BALANCE (1)-(2+3)		
	No	UNIT	Paddy	Other	No.	Rate	Sate of Paddy	Other Works	Food	House	Health	Education	AGT-Input	Worker	Machinery	Rent		Others	Total
01	0.0	0.0	0.0	0.0	0.0	0.0	1,877	200	1,677	310	260	2,302	147	50	200	40	0	3,600	3,848
02	0.0	0.0	0.0	0.0	0.0	0.0	1,280	800	1,024	473	235	1,328	161	250	320	0	0	3,600	3,848
03	0.0	0.0	0.0	0.0	0.0	0.0	1,386	800	1,299	635	1,155	3,089	99	110	298	0	0	3,600	3,848
04	0.0	0.0	0.0	0.0	0.0	0.0	1,840	0	1,840	370	112	1,228	277	320	248	0	0	3,600	3,848
05	0.0	0.0	0.0	0.0	0.0	0.0	935	0	935	370	112	1,228	277	320	248	0	0	3,600	3,848
06	0.0	0.0	0.0	0.0	0.0	0.0	1,200	0	1,200	370	112	1,228	277	320	248	0	0	3,600	3,848
07	0.0	0.0	0.0	0.0	0.0	0.0	1,200	0	1,200	370	112	1,228	277	320	248	0	0	3,600	3,848
08	0.0	0.0	0.0	0.0	0.0	0.0	1,200	0	1,200	370	112	1,228	277	320	248	0	0	3,600	3,848
09	0.0	0.0	0.0	0.0	0.0	0.0	1,200	0	1,200	370	112	1,228	277	320	248	0	0	3,600	3,848
10	0.0	0.0	0.0	0.0	0.0	0.0	1,200	0	1,200	370	112	1,228	277	320	248	0	0	3,600	3,848
11	0.0	0.0	0.0	0.0	0.0	0.0	1,200	0	1,200	370	112	1,228	277	320	248	0	0	3,600	3,848
12	0.0	0.0	0.0	0.0	0.0	0.0	1,200	0	1,200	370	112	1,228	277	320	248	0	0	3,600	3,848
13	0.0	0.0	0.0	0.0	0.0	0.0	1,200	0	1,200	370	112	1,228	277	320	248	0	0	3,600	3,848
HN 0.0	0.0	0.0	0.0	0.0	0.0	0.0	1,063	762	1,825	583	242	2,067	100	24	160	0	0	3,600	3,848
14	0.3	0.0	0.0	0.0	0.0	0.0	1,066	500*	566	640	30	1,428	23	45	76	0	0	3,600	3,848
15	0.3	0.0	0.0	0.0	0.0	0.0	2,540	0	2,540	470	285	2,825	193	9	848	0	0	3,600	3,848
16	0.4	0.0	0.0	0.0	0.0	0.0	1,740	0	1,740	680	448	2,188	173	0	65	0	0	3,600	3,848
17	0.4	0.0	0.0	0.0	0.0	0.0	2,569	0	2,569	330	400	2,169	199	0	325	0	0	3,600	3,848
18	0.4	0.0	0.0	0.0	0.0	0.0	1,500	0	1,500	555	100	1,605	99	140	287	0	0	3,600	3,848
19	0.4	0.0	0.0	0.0	0.0	0.0	1,500	0	1,500	555	100	1,605	99	140	287	0	0	3,600	3,848
20	0.4	0.0	0.0	0.0	0.0	0.0	1,500	0	1,500	555	100	1,605	99	140	287	0	0	3,600	3,848
21	0.4	0.0	0.0	0.0	0.0	0.0	1,500	0	1,500	555	100	1,605	99	140	287	0	0	3,600	3,848
22	0.3	0.0	0.0	0.0	0.0	0.0	1,500	0	1,500	555	100	1,605	99	140	287	0	0	3,600	3,848
23	0.1	0.0	0.0	0.0	0.0	0.0	2,550	0	2,550	660	63	2,613	193	62	345	0	0	3,600	3,848
24	0.2	0.0	0.0	0.0	0.0	0.0	1,320	0	1,320	320	160	1,480	47	0	30	0	0	3,600	3,848
HN 0.3	0.0	0.0	0.0	0.0	0.0	0.0	2,011	42	2,053	688	325	2,378	99	133	220	1	0	3,600	3,848
26	0.9	0.0	0.0	0.0	0.0	0.0	1,300	150	1,450	495	189	1,639	171	88	147	0	0	3,600	3,848
27	0.5	0.0	0.0	0.0	0.0	0.0	2,400	0	2,400	634	128	3,034	80	164	140	0	0	3,600	3,848
28	0.5	0.0	0.0	0.0	0.0	0.0	1,250	300*	1,550	353	504	2,054	111	120	358	0	0	3,600	3,848
29	0.6	0.0	0.0	0.0	0.0	0.0	1,538	0	1,538	300	296	1,834	81	120	190	0	0	3,600	3,848
30	0.6	0.0	0.0	0.0	0.0	0.0	1,538	0	1,538	300	296	1,834	81	120	190	0	0	3,600	3,848
31	0.5	0.0	0.0	0.0	0.0	0.0	2,580	0	2,580	584	580	3,160	128	168	143	0	0	3,600	3,848
32	0.5	0.0	0.0	0.0	0.0	0.0	2,580	0	2,580	584	580	3,160	128	168	143	0	0	3,600	3,848
33	0.7	0.0	0.0	0.0	0.0	0.0	1,710	0	1,710	410	380	2,090	158	230	340	0	0	3,600	3,848
34	0.5	0.0	0.0	0.0	0.0	0.0	1,380	0	1,380	255	50	1,430	88	120	250	0	0	3,600	3,848
35	0.6	0.0	0.0	0.0	0.0	0.0	1,200	0	1,200	255	165	1,365	122	72	280	0	0	3,600	3,848
36	0.6	0.0	0.0	0.0	0.0	0.0	1,200	0	1,200	255	165	1,365	122	72	280	0	0	3,600	3,848
37	0.6	0.0	0.0	0.0	0.0	0.0	1,200	0	1,200	255	165	1,365	122	72	280	0	0	3,600	3,848
38	0.5	0.0	0.0	0.0	0.0	0.0	1,680	0	1,680	1,145	320	2,005	244	472	295	0	0	3,600	3,848
39	0.6	0.0	0.0	0.0	0.0	0.0	2,025	0	2,025	730	140	2,165	301	90	52	0	0	3,600	3,848
HN 0.6	0.0	0.0	0.0	0.0	0.0	0.0	2,033	30	2,063	627	311	2,374	127	185	189	3	0	3,600	3,848

NOTES: (1) HN---Mean or Average
 (2) * mark in SALE OF OTHER CROPS exclusively means SALE OF LIVESTOCK PRODUCTS
 (3) ** mark in SALE OF OTHER CROPS include SALE OF LIVESTOCK PRODUCTS
 (4) * mark in WEAR/HOUSE EXPENDITURE include BUILDING COST OF NEW HOUSE
 (5) * mark in HEALTH/EDUCATION (including recreation, etc.) EXPENDITURE include PILGRIMAGE TRIP EXPENDITURE

CODE	CROPPING AREA		FAMILY WORKER		ANNUAL INCOME			ANNUAL LIVING EXPENDITURE			ANNUAL PRODUCTION EXPENDITURE					BALANCE (1)-(2+3)				
	No. Own	Land	No. of Family	No. of Family	State of	Cross	Farm	Other	Total	Food	House	Health	Education	Total	Agri. Input		Hired Worker	Machinery	Land Rent	Others
41	0	0	0	0	0	0	0	0	0	2,728.6	1,173.6	270	2,213.8	343.7	400	300	0	200	1,383.7	94.2
42	0	0	0	0	0	0	0	0	0	1,723.2	420	270	2,213.8	343.7	400	300	0	200	1,383.7	94.2
43	0	0	0	0	0	0	0	0	0	1,594.8	1,715	822	2,131.4	183.4	240	501.5	0	60	884.9	1,846.9
44	0	0	0	0	0	0	0	0	0	1,940.4	1,085	600	2,525.2	311	80	141	0	700	1,332	-1,911.8
45	0	0	0	0	0	0	0	0	0	2,532.2	1,085	1,260	3,817.4	360	270	20	1,300	2,740	2	0.653
46	0	0	0	0	0	0	0	0	0	1,472.4	1,085	1,115	2,587.4	429.9	270	260	0	0	807.6	659
47	0	0	0	0	0	0	0	0	0	1,928.4	750	1,275	3,198.4	251.6	270	305	0	0	811.8	-659
48	0	0	0	0	0	0	0	0	0	1,900.8	1,250	1,275	3,175.8	116.8	410	140	0	2,400	3,066.7	197
49	0	0	0	0	0	0	0	0	0	1,953.8	1,250	635	3,203.8	114.2	280	41.5	0	1,300	2,355.7	-2,044.5
50	0	0	0	0	0	0	0	0	0	1,520.4	1,735	292	3,555.4	133.9	170	500	0	520	1,038.9	1,853.7
51	0	0	0	0	0	0	0	0	0	1,640.4	1,310*	110	3,064.3	167.5	240	60	0	0	497.5	-1,807.9
52	0	0	0	0	0	0	0	0	0	2,696.5	3,318*	2,020*	8,034.3	143.5	300	232.5	30	410	1,116	3,120.5
53	0	0	0	0	0	0	0	0	0	1,385.3	4,393*	1,888	5,966.6	95.6	300	225	0	0	540	6,816.9
54	0	0	0	0	0	0	0	0	0	1,777.6	3,433*	130	5,966.6	111.8	400	350	0	30	891	-1,950.9
55	0	0	0	0	0	0	0	0	0	1,197.6	3,653*	820	6,221	298	650	352.5	60	0	1,370	-2,246.2
56	0	0	0	0	0	0	0	0	0	1,775	1,618.6	333.2	3,933.2	218.2	276.9	237.9	68.1	334	1,234.8	-1,388.2
57	0	0	0	0	0	0	0	0	0	2,15	2	200	3,350	4	200	504	0	0	955	4
58	0	0	0	0	0	0	0	0	0	1,869	955	190	2,665	250	250	330	0	40	895	955
59	0	0	0	0	0	0	0	0	0	2,424	460	520	3,404	835	840	384	0	0	1,439.2	+3,330.2
60	0	0	0	0	0	0	0	0	0	1,430.8	500	400	2,330.8	900	200	70	0	1,444	2,444	0
61	0	0	0	0	0	0	0	0	0	1,696.8	1,635	661	3,952.6	610	1,600	1,100	0	0	3,815.6	-2,326.1
62	0	0	0	0	0	0	0	0	0	1,954.4	1,635	250	3,568.8	500	1,600	1,500	0	0	4,856.9	2,931.1
63	0	0	0	0	0	0	0	0	0	2,495.4	1,635	208	4,228.8	590	150	32.5	0	150	866	2
64	0	0	0	0	0	0	0	0	0	1,870.8	740	1,400	3,010.8	840	100	255	0	100	1,112	-1,207.7
65	0	0	0	0	0	0	0	0	0	3,228.8	1,320	1,190	5,748.8	330	1,000	462.5	0	0	7,112	7
66	0	0	0	0	0	0	0	0	0	574.6	1,115	598	1,287.6	820	1,000	100	60	200	2,000	1,745.4
67	0	0	0	0	0	0	0	0	0	1,461.6	540	2,280	4,287.6	582.2	500	535	0	200	1,687.3	2,255
68	0	0	0	0	0	0	0	0	0	2,615.2	680	1,050	4,345.2	159.5	400	400	0	400	1,499.5	+1,439.5
69	0	0	0	0	0	0	0	0	0	1,015.2	445	1,170	2,630.2	292.7	160	480	0	0	1,932.7	+1,487.1
70	0	0	0	0	0	0	0	0	0	2,016.4	901.1	524.9	3,444.3	214.1	472.8	382.2	3.8	323	1,333.9	+537.5
71	0	0	0	0	0	0	0	0	0	4,040.4	395	390	5,335.4	268.2	900	435	0	14	6,172.2	+1,437.4
72	0	0	0	0	0	0	0	0	0	1,096.4	1,355	460	3,011.4	435.2	1,280	822.5	0	0	2,197.2	+1,860.4
73	0	0	0	0	0	0	0	0	0	1,442.4	435	400	2,277.4	188	500	35	0	120	2,333	0
74	0	0	0	0	0	0	0	0	0	3,322	4,360*	350	7,022	388	388	930	0	138	2,336.1	-2,425.9
75	0	0	0	0	0	0	0	0	0	3,580.8	1,635	410	5,629.8	401.7	1,040	300	0	217	1,451	2
76	0	0	0	0	0	0	0	0	0	2,152.2	823	371	3,992.6	250	240	358	0	0	398	8
77	0	0	0	0	0	0	0	0	0	2,241.6	1,708	340.4	4,291.6	323.6	1,030	518.5	0	0	301.1	4
78	0	0	0	0	0	0	0	0	0	2,141.8	1,708	350	3,199.8	340.4	850	60	0	0	1,900.4	+3,459.8
79	0	0	0	0	0	0	0	0	0	2,511.3	1,312.4	415.3	4,239	355.7	183.2	615.3	6.7	74	1,355.1	+3,912.1
80	0	0	0	0	0	0	0	0	0	4,107.6	5,950*	320	10,371.6	431.2	600	655	0	0	1,686.2	-2,193.8
81	0	0	0	0	0	0	0	0	0	1,046	1,470	765.4	4,123.4	1,530	1,530	280	0	0	2,222.5	-1,646.9
82	0	0	0	0	0	0	0	0	0	3,303.6	1,300	1,280	5,887.2	478.8	1,200	615	0	700	2,444.8	+1,662.9
83	0	0	0	0	0	0	0	0	0	2,290*	2,290*	1,600	7,912.2	571.7	1,663	200	0	0	2,341.7	+1,341.7
84	0	0	0	0	0	0	0	0	0	3,193.2	2,525*	770	6,488.2	514.7	1,400	900	0	0	2,814.1	+1,497.1
85	0	0	0	0	0	0	0	0	0	3,255.6	1,410	820	5,485.6	1,187.4	1,100	1,420	0	360	4,067.4	+5,447
86	0	0	0	0	0	0	0	0	0	2,574.2	2,574.2	958.2	6,739.8	599.3	1,115.5	686.7	0	177	2,576.1	-1,199

**TABLE C.4-4 PRODUCTION COST OF RICE IN EX-AMOL & BABOL SHAHRESTANS
IN 1989, 1990 & 1991**

TOTAL ANNUAL INPUT PER HECTARE PADDY				IN THE PROJECT AREA			
YEAR AREA	TOTALCOST	MACHINERY machine %	MAN.LABOR labour %	OTHER INPUT	d.o.%		
1989 AMOL	663.4	174.2	26.3%	432.5	65.2%	56.7	8.5%
BABOL	863.3	222.9	25.8%	534.0	61.9%	106.4	12.3%
1990 AMOL	816.3	219.7	26.9%	508.5	62.3%	88.1	10.8%
BABOL	749.3	185.3	24.7%	478.3	63.8%	85.7	11.4%
1991 AMOL	788.1	201.1	25.5%	517.9	65.7%	69.0	8.8%
BABOL	860.2	173.1	20.1%	596.1	69.3%	91.0	10.6%
MEAN AMOL	755.9	198.3	26.2%	486.3	64.3%	71.3	9.4%
BABOL	824.3	193.8	23.5%	536.1	65.0%	94.4	11.5%
PROJ' AREA	805.5	207.2	25.7%	520.2	64.6%	78.2	9.7%

		MANUAL LABOR COST PER MAN-DAY				IN THE PROJECT AREA	
PRACTICE	TOTAL RATE	PLOWING	NURSERY	PLANTING	WEEDING	HARVESTING	THRESHING
1989 AMOL	5,643	4,051	5,566	5,121	5,904	6,912	5,849
BABOL	6,830	3,625	4,364	8,434	7,113	7,862	6,551
1990 AMOL	6,982	n.a	4,906	7,963	7,647	8,439	8,301
BABOL	6,471	5,270	3,700	7,645	5,671	8,164	8,345
1991 AMOL	7,858	n.a	6,183	8,015	5,797	9,724	11,520
BABOL	7,452	3,957	6,346	8,779	6,009	10,885	9,371
MEAN AMOL	6,828	4,510	5,551	7,033	6,449	8,358	8,557
BABOL	6,917	4,284	4,803	8,286	6,264	8,970	8,089
PROJ' AREA	6,854	4,442	5,328	7,407	6,394	8,541	8,417

Labor cost in 1992 (man-day basis) is estimated from the above total rate as follows* weighted mean average

	1989	1990	1991
average	6,854	5,997	6,830
annual rate of wage base increment	$(7737 - 5997)/2 = 870$ Rial/year		
estimated mean wage for 1992 =	$6830 + 2 \times 870 = 8,570$ R/man-day		

As to the annual increasing rate for total input cost for 1992, official prices have been frozen-fixed, hence only the growth in labor wage base is accounted to lead the result; growth rate = $870/8,570 = 10.1\%$

$$10.1\% \times 520.2/805.5 = 6.5\%$$

TABLE C.4-5 MARKET PRICE OF RICE BY VARIETY IN AMOL CITY SINCE 1360

Year	Tarom			Amol-1			Amol-3			Haraz			Guarantee Price *
	Far	Sha	Esf	Far	Sha	Esf	Far	Sha	Esf	Far	Sha	Esf	
1360	155	165	165										
61	160	190	240			175							110
62	310	260	270	160									
63	270	270	300	170					175				170
64	360	320	420				190	250	220				200
65	430	520	620				240	310	400		400	500	225
66	630	550	570				360	250	220	500	300	280	350
67	550	490	650				220	290	460	280	350	550	320
68	730	870	960				500	500	460	590	580	530	350
69	1,000	830	900				480	330	470	560	470	550	360
70	900						540			580			400

Note-1: Unit in rial/kg of rice with less than 10% of broken rice.

Note-2: The year of 1360 is starting from March 21, 1981

Note-3: Far = Farvardin (1st Iranian month)

Sha = Shahrivar (6th month), Esf = Esfand (12th month)

* Guarantee price means that the purchasing price of rice, mainly Amol-3 in case of Amol area, by the public sector/s.

TABLE C.4-6 FARM-GATE PRICE FLUCTUATION IN 1991-92 IN THE PROJECT AREA

YEAR/MONTH	UNIT: RIAL / KG						
	TAROMRICE	KHAZAR	HARAZRICE	TAROMASGRI	AMOL-3	WHEAT	BARLEY
1991 AUG	855	656	650	607	580	160	115
SEPT	841	640	670	535	533	160	115
OCT	920	653	590	535	510	160	115
NOV	893	640	580	562	503	160	115
DEC	915	685	605	620	490	160	115
1992 JAN	982	707	590	640	509	185	115
FEB	1,134	840	640	735	558	185	135
MAR	1,209	920	675	825	580	185	135
APR	1,233	1,030	758	783	640	185	135
MAY	1,363	1,118	860	937	685	160	105
JUN	1,263	1,125	860	947	700	160	107
JUL	1,080	950	800	920	680	160	110
YEARAVERAG	1,057	830	690	721	581	168	118
PADDY-EQUIVALENT	661	519	431	450	363	-	-
YEAR/MONTH	LETTUCE	CUCUMBER	BROADBEAN	DRY B. BEAN	GARLIC	COWS MEAT	COWS MILK
1991 AUG	-	150	-	320	300	2,300	150
SEPT	-	185	-	320	350	2,300	150
OCT	-	300	-	320	550	2,350	150
NOV	-	300	-	320	600	2,400	150
DEC	-	-	-	320	600	2,650	150
1992 JAN	-	-	-	320	600	2,900	170
FEB	100	900	-	320	600	3,300	170
MAR	70	600	-	320	600	3,450	170
APR	90	400	-	320	375	3,450	200
MAY	-	250	100	320	225	3,670	200
JUN	-	180	120	320	225	3,670	200
JUL	-	125	-	320	200	3,700	200
YEARAVERAG	87	633	110	320	525	3,400	180

TABLE C.4-7 COST ESTIMATION FOR WITH-PROJECT CROP PRODUCTION COST IN THE PROJECT AREA

1. CALCULATION OF ACREAGE COVERED BY A SET OF MACHINERY

MACHINERY	SIZE/WIDTH	PEAK PERIOD OF WORK	PERI-ANNUAL O.P.DAYS	FIELD WORK EFFICIENCY	SPEED OF OPERATION	MAX. COVER-AGE (ha)	NUMBER OF SET/ha
TRANSPLANTER	8rows	Apr 21 - June 9	45	0.58	0.55	99.2	0.02
PADDY COMBINE	5rows	Aug 11 - Sept 25	41	0.65	0.74	96.6	0.02
PADDY TRACTOR	65 HP	Apr 6 - June 6	52	0.70	0.65	163.5	0.01
NURSERY SET	1200box	Mar 30 - May 19	21 x 1.5times/year, 32 days		11.5 mandays/1200boxes		1.00

note : plot size averages at 0.4ha, operating hours per day 8 hours, field efficiency adjusted by field size, workable days during period of operation is set at 0.85 -0.9, puddling forms peak operation for tractor sets. Sets of machinery to be equipped per 100 ha is determined as double the maximum coverage for user's convenience

2. ESTIMATED DEPRECIATION OF MACHINERY ABOVE LISTED (in 1000 Rial, ton/set)

MACHINERY	ATTACHMENT	VALUE OF A	VALUE OF B	WEIGHT A + B	FREIGHT A + B	INLAND TRANS-PORT COST A+B	FINAL VALUE
T. PLANTER	parts 15%	9,550	1,433	0.65	179	70	11,232
COMBINE	d.o.	35,140	5,587	3.16	869	338	41,934
TRACTOR	attachment	19,100	22,406	4.15	1,141	444	43,091
NURSERY	local box	2,261	226	1.80	405	193	3,085

3. ESTIMATED FINANCIAL DEPRECIATION COST PER HA (1000 Rial, ha)

MACHINERY	VALUE/SET	ha/MACHINE	VALUE/ha	HOURS/YEAR	LIFE(hrs)	DEPRECIATION/ha (hr)
T. PLANTER	11,232	0.02	224.6	360	2,700	38.1 (7.93)
COMBINE	41,934	0.02	838.7	328	3,000	138.0 (33.2)
TRACTOR	43,091	0.01	430.9	416	3,600	69.1 (28.6)
NURSERY	3,085	0.15	462.8	768	7,560	70.7 (1.05)
TOTAL MACHINERY						315.9 (70.8)

4. ESTIMATED ECONOMIC COST FOR MACHINERY OF PADDY CROPPING (1000 Rial/machinery)

MACHINERY	FOREIGN.C. PORTION	DOMESTIC C. PORTION	CONVERTED ECON. VALUE	ANNUAL FUEL COST	ECONOMIC FUEL COST	MAINTENENCE COST/YEAR	TOTAL ECON. COST
T. PLANTER	11,232	0	11,232	6.85	48	842	12,122
COMBINE	41,934	0	41,934	20.40	143	3,145	45,222
TRACTOR	32,318	10,773	40,366	164.40	1,151	3,027	44,544
NURSERY	1,851	1,234	2,773	6.75	47	208	3,028
TOTAL				198.40	1,389	7,223	104,916

COST ESTIMATION FOR WITH-PROJECT CROP PRODUCTION IN THE PROJECT AREA

5. WITH-PROJECT MACHINERY COST PER ha PER year (1000 Rial)

							(contd.)
MACHINERY	ECONOMIC COST/SET	AREA COVERAGE/SET	ECON.COST PER ha	DEPRECIATION/y/ha	ECON.FUEL COST/y/ha	ECON.O.M. COST/y/ha	MACHINERY COST/y/ha
T. PLANTER	12,122	50	242.4	38.1	6.85	2.9	47.8
COMBINE	45,222	50	904.4	138.0	20.40	10.4	168.8
TRACTOR	44,544	100	445.4	69.1	164.40	5.2	238.7
NURSERY	3,028	7.5	403.7	70.7	6.75	5.3	82.8
TOTAL MACHINERY			1,996.1	315.9	198.40	23.7	538.0

6. ESTIMATED WITH-PROJECT LABOR COST PER ha PER year (1000 Rial) Rial)

MANUAL LABOR COMPONENT/ha	MACHINERY OPERATION	NURSERY CARING	WEEDING/ REPLANTING	IRRIGATION	POST-HARVEST LABOR	TOTAL LABOR/ha
man-day/ha	1.2	6.7	5.6	4.9	2.5	20.9
LABOR WAGE/manday	14.4	5.5	6.5	4.6	9.0	40.0
FINANCIAL COST / ha	17.3	36.9	36.4	22.5	22.5	135.6
conversion factor	0.906	0.376	0.376	0.376	0.376	0.406
ECONOMIC COST / ha	15.7	13.9	13.7	8.5	8.5	60.1

7. ESTIMATED WITH-PROJECT OTHER INPUT COST PER ha PER year (1000 Rial)

KIND OF INPUT MAJOR INPUT NAME	PADDYSEED Amol -3	FERTIKIZER urea	CHEMICALS satarn	WATER FEE per ha	DRYINGKIT heat drier	subtotal
QUANTITY/ha/year/kg	30	350	15	12000cu.m	1	
UNIT INPUT COST/kg	0.805	0.019	1.600	0.003	10.168	
FINANCIAL COST / ha	24.15	6.65	24.00	30.00	10.17	94.968
conversion factor	0.906	0.981	1.000	0.482	0.774	
ECONOMIC COST / ha	21.880	6.524	24.000	14.460	7.870	74.734
						TOTAL
MAJOR INPUT NAME	benlate	D.A.P.	diazinon	drying labor	fuel	INPUT COST
QUANTITY/ha/year	0.5	100	12	0.5manday	12	
UNIT INPUT COST / kg	1.650	0.025	0.325	8.500	0.015	
FINANCIAL COST / ha	0.825	2.500	3.900	4.250	0.180	106.623
conversion factor	1.000	0.981	1.000	0.376	7.000	
ECONOMIC COST / ha	0.825	2.453	3.900	1.598	1.260	84.769

8. PROPOSED WITH-PROJECT PRODUCTION COST PER ha PER year (1000 Rial)

COST-PRICE BASIS	MACHINERY	MAN'LABOR	OTHER INPUT	TOTAL COST	per cent
FINANCIAL PRICE	538.0	135.6	106.6	780.2	
ECONOMIC PRICE	538.0	60.1	84.8	682.9	87.5

9. PLANNED MAJOR MACHINERY OPERATION COVERING 100 ha / 2 SETS OF MACHINERY

Crop Operation	unit : * hrs/ha + days/year						
	paddy	paddy	paddy	paddy top-dressing	paddy harvesting	berseem	berseem collecting
Operation	plowing	puddling	planting	spraying	harvesting	plowing	mowing
Machinery	tractor	d. o.	transplanter	tractor	ATcombine	tractor	tractor
Period in	Mar.10	Apr.10	Apr.20	Jun.15	Aug. 1	Sept.1	Jan.15
Period out	Apr.15	May 20	May 31	Jul.31	Sept20	Oct.20	Mar.31
Fine Days+	33.0	37.0	38.0	43.0	46.0	32.0	51.0
Speed(A) *	3.1	3.2	3.0	2.6	3.4	1.8	3.6
F.E. (B)	0.70	0.70	0.70	0.65	0.70	0.70	0.65
W.R. (AB)*	4.43	4.57	4.29	4.00	4.86	2.57	5.54
Days/year	27.7	28.6	26.8	25.0	30.4	16.1	34.6
% FineDays	83.9	77.2	70.5	58.1	66.0	50.2	67.9

note : Speed; operation speed of machinery. F.E.; field efficiency
W.R.; effectiveness working rate, Days/year; days required to cover 50 ha
by a set of machinery, % Finedays; rate of operation on fine days,
unit of puddling counted twice, also spraying counted twice = 1.3 x 2,
while grass cutting counted as 3 times = 1.2 x 3.

Annual Working Hours and Depreciation per ha by Machinery
Calculated from the above shown system of joint use

Machinery	Annual Operation Days Covering 50ha	Total hrs per year	Total hrs per ha	Machine Life,hrs	1000 Rial	
					Depreciation Cost/ha/year	Life years
TRACTOR	131.9	1055.2	21.1	3,600	293.4	3.4
T.PLANTER	26.8	214.4	4.3	2,700	60.5	12.6
AT COMBINE	28.3	226.4	4.5	3,000	214.8	13.3

note : T.PLANTER; transplaner, out of the cost for tractor, 73.8% account for
the share for paddy, and 26.2% that on berseem. AT ; Auto-Threshing

Financial Costs of Machinery Use by the System of 2 sets/100ha as Shown Above

Machinery	Annual Cost in 1000 Rial/50ha				Total Cost /ha/year*	Crop Income/ha/year Paddy + Berseem	Rate of MachinCost
	Fuel etc.	Operator	Spareparts				
TRACTOR	896.9	1118.5	1455.3	362.8			
T.PLANTER	27.9	227.3	133.7	68.3	3222.0	1320.0	
AT COMBINE	113.2	240.0	496.7	231.8		14.6%	

note : * including depreciation, 152.9 2130.0 256.0 6.4%
corresponding data from current farm economy is given the above column.

MAJOR AGRICULTURAL INPUTS REQUIREMENT PER HA

input	rate in kg/ha. * l/ha	Taron	otherPaddy	Berseem	Vegetable	Broadbean	Barley
INPUT	STAGE						
seeds	W.O.P.	60	50	40	1	50	40
	W. P.	30	30	40	1	50	0
fertilizers							
NITROGEN	W.O.P.	90	210	30	690	60	50
(in urea)	W. P.	100	160	20	690	60	0
PHOSPHATE	W.O.P.	85	115	0	690	60	20
(in DAP)	W. P.	100	100	80	690	60	0
POTASH	W.O.P.	0	0	0	50	0	0
(in KCl)	W. P.	50	50	20	100	0	0
herbicides							
RONSTAR*	W.O.P.	4	5	0	0	0	0
(or2-4-D)	W. P.	5	5	0	0	0	0
MACHET	W.O.P.	40	50	0	0	0	0
	W. P.	20	25	0	0	0	0
chemicals							
DIAZINON	W.O.P.	30	30	0	sevin 15	0	0
	W. P.	40	40	0	sevin 15	0	0
HINOZAN	W.O.P.	20	30	0	0	0	0
	W. P.	30	30	0	0	0	0
BENLATEetc	W.O.P.	0	0	0	0	0	0
(nursery)	W. P.	0.1	0.1	0	0	0	0
input requirement in ton							
seeds	W.O.P.	2,111	2,239	218	4	10	13
	W. P.	855	1,425	2,015	6	17	0
fertilizers							
NITROGEN	W.O.P.	3,167	9,405	164	2,519	11	17
(in urea)	W. P.	2,849	7,599	1,008	4,340	20	0
PHOSPHATE	W.O.P.	2,287	5,150	0	2,519	11	7
(in DAP)	W. P.	2,849	4,749	4,031	4,340	20	0
POTASH	W.O.P.	0	0	0	183	0	0
(in KCl)	W. P.	1,425	2,375	1,008	629	0	0
herbicides							
RONSTAR*	W.O.P.	141	224	0	0	0	0
(or2-4-D)	W. P.	142	237	0	0	0	0
MACHET	W.O.P.	1,407	2,239	0	0	0	0
	W. P.	570	1,187	0	0	0	0
chemicals							
DIAZINON	W.O.P.	1,056	1,344	0	0	0	0
	W. P.	1,140	1,900	0	0	0	0
HINOZAN	W.O.P.	704	1,344	0	0	0	0
	W. P.	855	1,425	0	0	0	0
BENLATEetc	W.O.P.	0	0	0	0	0	0
(nursery)	W. P.	3	5	0	0	0	0

note : use of agricultural chemicals tends to decrease, owing to land consolidation that enables to keep water in banded fields instead of overflowing, also to prevent water from contamination with chemicals, thereby effluent from paddy field would contain reduced order of fish poison etc.

APPENDIX D. SOCIO-ECONOMY

APPENDIX D. SOCIO-ECONOMY

CONTENTS

	<u>Page</u>
D.1 Demography	D1-1
D. 1. 1 Population in the Project Area	D1-1
D. 1. 2 Age Group Population	D1-2
D. 2 Man-Power	D2-1
D. 2. 1 Population Distribution by Employment Status	D2-1
D. 2. 2 Population Distribution by Sectors	D2-2
D. 2. 3 Illiteracy Ratio by Rural & Urban Areas	D2-2
D. 2. 4 Man-Power Requirement in the Project	D2-3
D. 3 Rural Institution & Economy	D3-1
D. 3. 1 List of Villages in the Project Area	D3-1
D. 3. 2 Outlook of Rural Cooperatives in the Project Area	D3-3
D. 3. 3 Record of Receipt of Credit from Bank of Agriculture in the Project Area	D3-3
D. 4 Rural Infrastructures	D4-1
D. 4. 1 Availability of Social Infrastructure in the Project Area	D4-1

LIST OF TABLES

		<u>Page</u>
Table D. 1-1	Summary of Populaton in Project Area	D1-3
Table D. 1-2	Rural Population in the Project Area by Dehstans	D1-4
Table D. 1-3	Rural Population in the Project Area by Irrigation Zones	D1-5
Table D. 1-4	Population of Ex-Amol & Babol Shahrestans by Rural and Urban Areas	D1-6
Table D. 1-5	Male:Female Ratio by Age Group Population in Ex-Amol & Babol Shahrestans	D1-7
Table D. 1-6	Family Size Per Household in Ex-Amol & Babol Shahrestans	D1-8
Table D. 1-7	Age Group Population by Rural & Urban Areas in Ex-Amol & Babol Shahrestans	D1-8
Table D. 2-1	Population Distribution by Employment Status in Ex-Amol & Babol Shahrestans	D2-5
Table D. 2-2	Population Distribution by Sectors in Ex-Amol & Babol Shahrestans	D2-6
Table D. 2-3	Illiteracy Ratio by Rural & Urban Areas in Ex-Amol & Babol Shahrestans	D2-7
Table D. 3-1	List of Villages in the Project Area by Dehstans	D3-4
Table D. 3-2	Outlook of Rural Cooperatives in the Project Area	D3-17
Table D. 3-3	Record of Receipt of Credit from Bank of Agriculture in the Project Area by Rural Cooperatives	D3-18
Table D. 4-1	Availability of Social Infrastructure in the Project Area by Dehstans	D4-3
Table D. 4-2	Availability of Social Infrastructure in the Project Area by Irrigation Zones	D4-5

LIST OF FIGURES

		<u>Page</u>
Figure D. 2-1	Present Farming Labor Requirement	D2-8
Figure D. 2-2	Farming Labor Requirement Under Project	D2-8

APPENDIX D. SOCIO-ECONOMY

D. 1 Demography

(1) Data Applied

For demographical analysis of the Project Area, the census reports in 1976 and 1986 are available in the Shahrestan level, however these reports are not containing village by village population, which are only available in the Village Gazettes, a supplementary issue of the census reports, but they are not including demographic details.

(2) Analysis

The population distribution and the increase rates of population in the Rural Area were analyzed by data in the Villages Gazettes in 1976 and 1986. The summarized by the Dehstan and the Irrigation Zone are shown as Tables D. 1-2 and D. 1-3.

The above factors for the Urban Area are available in the census reports.

The urban:rural inhabitants ratio, male: female ratio, family size per household and age group structure are available in the Shahrestan level, which are shown as Tables D. 1-4, D. 1-5, D. 1-6 and D. 1-7, respectively.

Other demographic factors such as the rate of death, the rate of infant death, reproduction rate, etc. are not available in the above data.

D. 1. 1 Population in the Project Area

Table D. 1-1 shows the summary of population in the Project Area. The total population in the Project Area in 1986 was 425,348 and increase rate of population in 1976-86 was as much as 4.4%. Therefore population in 1992 is assumed as 550,740 if same increase rate is kept. At the same period, the

increase rate of Ex-Amol Shahrestan was 3.6%, therefore the population in the Project Area will be assumed as 525,900 applying the rate of 3.6% per annum. From those two figures, the present population in the Project Area is assumed as between 525,900 and 550,740.

D. 1. 2 Age Group Population

The summary of age group population in 1976 and 1988 at ex-Amol and ex-Babol Shahrestans are shown in the Table D. 1-7 below, and following demographic characteristics can be read therefrom:

- * During a decade from 1976 to 1986, the population structure in the urban area had a notable change that was considerable increase of ratio in 20-39 years old group.
- * In case of the rural area, a pyramid shape population structure was kept. At the same time, there was a trend of population outflow especially in the younger generation.
- * In total, both Shahrestans had population inflow other than natural increase.

TABLE D.1-1 SUMMARY OF POPULATION IN PROJECT AREA

	No. of Village	Population		Increase Rate of Population
		1976	1986	
AMOL SHAHRESTAN:				
Amol City		68,963	118,242	5.5%
Mahmudabad City		7,098	11,856	5.3
SUB-TOTAL		76,061	130,098	5.5%
Chalav	3/ 49	1,354	1,979	3.9%
Bala Khiaban Latikuh	18/ 24	6,843	8,834	2.6
Poin khiaban Latikuh	39/ 39	11,310	15,835	3.4
Dasht Sar	54/ 62	18,320	26,167	3.6
Dabu Junubi	90/ 90	27,775	38,680	3.4
Harazpei Junubi	46/ 46	11,808	16,340	3.3
Ahlamrostagh	35/ 35	17,544	23,829	3.1
Harazpei Shomali	33/ 33	15,228	20,774	3.2
Dabu Shomali	23/ 23	12,503	18,132	3.8
SUB-TOTAL	341/401	122,685	170,570	3.4%
TOTAL OF AMOL		198,746	300,668	4.2%
BABOLSAR SHAHRESTAN:				
Feridon Kenar City		2,607	20,997	23.2%
Emamzadeh Abudallah	18/ 18	12,225	16,060	2.8%
Barik Rud	16/ 16	7,084	11,563	5.0
Rud Bast	19/ 40	9,565	12,568	2.8
SUB-TOTAL	53/ 74	28,874	40,191	3.4 %
TOTAL OF BABOLSAR		31,481	61,188	6.9%
BABOL SHAHRESTAN:				
Lalehabad	39/ 49	19,791	26,521	3.0%
Karipei	58/ 58	27,357	36,971	3.1
TOTAL OF BABOL	97/107	47,148	63,492	3.0%
TOTAL PROJECT AREA	491/582	277,375	425,348	4.4%
TOTAL OF URBAN AREA		78,668	151,095	6.7
TOTAL OF RURAL AREA		198,707	274,253	3.3
Babol City		68,059	115,320	5.4%
Babolsar City		18,810	28,589	4.3%

TABLE D.1-2 RURAL POPULATION IN THE PROJECT AREA BY DEHSTANS

REFERENCE CODES	1976 Total	POPULATION IN 1976 AND 1986						Ratio of Population			INCREASE RATE OF POPULATION IN 1976-1986 (%)
		Population in 1976			Population in 1986			6 yrs over (%)	Literacy (%)	Employed (%)	
		Total	6 yrs over	Literacy	Total	6 yrs over	Literacy				
Dehstan											
AU	44	66	52	23	22	78.8	34.8	33.3	4.1		
DN001	1,354	1,530	1,530	793	436	77.3	40.1	22.0	3.9		
DN002	6,843	8,834	7,195	4,343	2,268	81.4	48.2	25.7	2.6		
DN003	11,268	15,769	12,878	7,709	4,099	81.7	48.9	26.0	3.4		
DN004	18,320	26,167	21,254	13,540	5,739	81.2	51.7	21.9	3.6		
DN005	27,775	38,680	30,841	18,381	9,115	78.7	47.5	23.6	3.4		
DN006	11,808	16,340	13,002	8,383	3,870	79.6	51.3	23.7	3.3		
DN007	17,544	23,829	19,285	11,725	5,636	80.9	49.2	23.7	3.1		
DN008	15,228	20,774	16,836	10,532	5,808	80.1	50.7	28.0	3.2		
DN009	12,503	18,132	14,560	9,150	4,941	80.2	50.5	27.3	3.8		
Sub-total	122,885	170,570	137,223	84,579	41,934	80.4	49.9	24.6	3.4		
DN010	12,225	16,060	12,755	7,328	3,881	79.4	45.6	24.2	2.8		
DN011	7,084	11,563	9,137	5,609	2,535	79.0	48.5	21.9	5.0		
DN012	9,565	12,568	9,942	5,338	3,432	79.1	42.5	27.3	2.8		
Sub-total	28,874	40,191	31,834	18,275	9,848	79.2	45.5	24.5	3.4		
BU	653	852	701	365	223	82.3	42.8	26.2	2.7		
DN013	19,781	26,521	21,541	12,385	7,422	81.2	46.7	28.0	3.0		
DN014	26,704	36,119	29,048	15,929	9,248	80.4	44.1	25.6	3.1		
Sub-total	47,148	63,492	51,290	28,678	16,893	80.8	45.2	26.6	3.0		
TOTAL	196,707	274,253	220,347	131,533	68,675	80.3	48.0	25.0	3.3		

TABLE D.1-3 RURAL POPULATION IN THE PROJECT AREA BY IRRIGATION ZONES

REFERENCE CODES Irrigation zone	POPULATION IN 1976 AND 1986								INCREASE RATE OF POPULATION IN 1976-1986 (%)
	1976 Total	Population in 1986				Ratio of Population			
		Total	6 yrs over	Literacy	Employed	6 yrs over(X)	Literacy (X)	Employed (X)	
HRU1	860	1,186	921	507	266	77.7	42.7	22.4	3.3
HRU2	494	793	609	286	170	76.8	36.1	21.4	4.8
HRU3	721	1,010	823	501	222	81.5	49.6	22.0	3.4
Sub-total	2,075	2,989	2,353	1,294	658	78.7	43.3	22.0	3.7
HW1	1,264	1,623	1,306	721	493	80.5	44.4	30.4	2.5
HW2	7,187	9,861	8,040	4,710	2,551	81.5	47.8	25.9	3.2
HW3	7,798	10,106	8,187	5,085	2,520	81.0	50.3	24.9	2.8
HW4	3,312	4,792	3,884	2,299	1,268	81.1	48.0	26.5	3.8
HW5	2,470	4,003	3,240	2,180	870	80.9	54.7	21.7	4.9
HW6	2,299	3,164	2,572	1,715	769	81.3	54.2	24.9	3.2
Sub-total	24,330	33,549	27,229	16,720	8,491	81.2	49.8	25.3	3.3
Total of HW	26,405	36,538	29,582	18,014	9,149	81.0	49.3	25.0	3.3
KL1	227	334	262	143	91	78.4	42.8	27.2	3.9
KL2	91	156	124	69	28	79.5	44.2	17.9	5.5
KL3	8,551	11,399	9,283	5,402	2,606	81.4	47.4	22.9	2.9
KL4	8,073	10,274	8,272	4,667	2,576	80.5	45.4	25.1	2.4
KL5	4,166	7,593	5,971	3,044	1,931	78.6	40.1	25.4	6.2
KL6	4,603	5,907	4,831	2,986	1,798	81.8	50.6	30.4	2.6
Sub-total	25,711	35,663	28,743	16,311	9,028	80.6	45.7	25.3	3.3
KR2	642	862	697	388	209	80.8	45.0	24.2	3.0
KR3	2,035	3,873	3,098	1,887	500	80.0	49.0	12.9	6.6
KR4	7,235	9,482	7,700	4,214	2,792	81.2	44.4	29.4	2.7
KR5	4,364	5,258	4,354	2,461	1,760	82.8	46.6	33.5	1.9
Sub-total	14,276	19,475	15,849	8,960	5,261	81.4	46.0	27.0	3.2
HE1	8,918	12,928	10,262	6,461	2,823	79.4	50.0	21.8	3.8
HE2	3,335	4,738	3,757	2,420	1,112	79.3	51.1	23.5	3.6
HE3	5,014	6,777	5,589	3,561	1,679	82.5	52.5	24.8	3.1
HE4	4,891	6,150	4,977	3,060	1,437	80.9	49.8	23.4	2.3
HE5	7,366	10,275	8,338	5,161	2,359	81.1	50.2	23.0	3.4
Sub-total	29,524	40,868	32,923	20,663	9,410	80.6	50.6	23.0	3.3
Total of HE, KL, KR	69,511	96,006	77,515	45,934	23,699	80.7	47.8	24.7	3.3
AE1	1,256	1,337	1,088	662	296	81.4	49.5	22.1	0.6
AE2	1,241	1,568	1,280	815	360	81.6	52.0	23.0	2.4
AE3	10,902	15,203	12,114	7,250	4,028	79.7	47.7	26.5	3.4
AE4	9,633	12,459	9,916	5,793	3,082	79.6	46.5	24.7	2.6
AE5	5,379	6,157	5,464	3,931	1,789	79.5	48.2	21.9	4.3
AE6	5,304	6,767	5,463	3,235	1,714	80.7	47.8	25.3	2.5
AE7	5,230	6,548	5,172	2,782	1,380	79.0	42.6	21.2	2.3
AE8	1,777	2,258	1,822	894	498	80.7	39.6	22.1	2.4
AE9	3,814	5,840	4,562	2,386	1,642	78.1	40.9	28.1	4.4
AE10	2,419	3,310	2,845	1,287	983	79.9	38.9	29.7	3.2
AE11	10,975	16,730	13,309	7,935	4,088	79.6	47.4	24.4	4.3
Sub-total	57,930	80,177	63,855	38,980	19,870	79.6	46.1	24.8	3.3
AW1	2,426	3,290	2,836	1,511	677	80.1	45.9	20.6	3.1
AW2	1,211	1,659	1,304	771	372	78.6	46.5	22.4	3.2
AW3	5,253	6,709	5,531	3,558	1,529	82.4	53.0	22.8	2.5
AW4	2,723	3,866	3,088	1,813	854	79.4	46.9	22.1	3.6
AW5	4,356	6,182	4,963	3,204	1,811	80.3	51.8	29.3	3.6
AW6	2,672	3,499	2,808	1,567	1,013	80.2	44.8	29.0	2.7
AW7	6,308	7,901	6,265	3,979	2,202	79.3	50.4	27.9	2.3
AW8	1,834	2,396	1,895	1,124	609	79.1	46.9	25.4	3.9
AW9	13,567	19,707	15,735	9,870	5,332	79.8	50.1	27.1	3.8
Sub-total	40,150	55,208	44,203	27,395	14,399	80.1	49.6	26.1	3.2
AU	2,823	4,204	3,295	2,193	994	78.4	52.2	23.6	4.1
BU	1,888	2,220	1,797	1,017	564	80.9	45.8	25.4	1.6
GRAND TOTAL	198,707	274,353	220,247	131,533	68,675	80.3	48.0	25.0	3.3

TABLE D.1-4 POPULATION OF EX-AMOL & BABOL SHAHRESTANS BY RURAL AND URBAN AREAS

	1976			1986			INCREASE RATE OF POPULATION
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	
<u>EX-AMOL SHAHRESTAN</u>							
URBAN AREA	76,061	39,363	36,698	131,323	66,448	64,875	5.6%
RURAL AREA	156,414	78,469	77,945	201,355	102,042	99,313	2.5
TOTAL	232,475	117,832	114,643	332,678	168,490	164,188	3.6%
<u>URBAN:RURAL RATIO</u>							
TOTAL POPULATION	32.7:67.3			39.5:60.5			
MALE POPULATION	33.4:66.6			39.4:60.6			
FEMALE POPULATION	32.0:68.0			39.5:60.5			
<u>EX-BABOL SHAHRESTAN</u>							
URBAN AREA	113,592	58,919	54,673	183,191	92,424	90,767	4.9%
RURAL AREA	235,026	114,722	120,304	304,745	150,896	153,849	2.6
TOTAL	348,618	172,631	174,977	487,936	243,320	244,616	3.4%
<u>URBAN:RURAL RATIO</u>							
TOTAL POPULATION	32.6:67.4			37.5:62.5			
MALE POPULATION	34.1:65.9			38.0:62.0			
FEMALE POPULATION	31.2:68.8			37.1:62.9			

TABLE D.1-5 MALE:FEMALE RATIO BY AGE GROUP POPULATION IN EX-AHOL & BABOL SHAHRESTANS

AGE GROUP	1976				1986			
	Total	Male	Female	M:F Ratio	Total	Male	Female	M:F Ratio
EX-AHOL SHAHRESTAN								
WHOLE AREA:								
~ 9	77,773	40,131	37,642	51.6:48.4	99,802	50,677	49,125	50.8:49.2
10~19	57,055	28,597	28,458	50.1:49.9	82,598	42,397	40,201	51.3:48.7
20~39	54,775	26,722	28,053	48.8:51.2	92,498	45,991	46,507	49.7:50.3
40~59	32,282	17,415	14,867	53.9:46.1	40,658	20,888	19,770	51.4:48.6
60~	10,590	4,967	5,623	46.9:53.1	17,122	8,537	8,585	49.9:50.1
TOTAL	232,475	117,832	114,643	50.7:49.3	332,678	168,470	164,188	50.6:49.4
RURAL AREA:								
~ 9	55,631	28,794	26,837	51.8:48.2	59,895	30,514	29,381	50.9:49.1
10~19	36,227	17,400	18,827	48.0:52.0	53,168	27,468	25,700	51.7:48.3
20~39	35,491	17,230	18,261	48.5:51.5	52,522	26,130	26,392	49.8:50.2
40~59	21,752	11,649	10,103	53.6:46.4	24,756	12,388	12,368	50.1:49.9
60~	7,313	3,396	3,917	46.4:53.6	10,987	5,525	5,462	50.3:49.7
TOTAL	156,414	78,469	77,945	51.1:48.9	201,328	102,025	99,303	50.7:49.3
URBAN AREA:								
~ 9	22,142	11,337	10,805	51.2:48.8	39,907	20,163	19,744	50.5:49.5
10~19	20,828	11,197	9,631	53.8:46.2	29,430	14,929	14,501	50.7:49.3
20~39	19,284	9,492	9,792	49.2:50.8	39,976	19,861	20,115	49.7:50.3
40~59	10,530	5,766	4,764	54.8:45.2	15,902	8,500	7,402	53.5:46.5
60~	3,277	1,571	1,706	47.9:52.1	6,135	3,012	3,123	49.1:50.9
TOTAL	76,061	39,363	36,698	51.8:48.2	131,350	66,465	64,885	50.6:49.4
EX-BABOL SHAHRESTAN								
WHOLE AREA:								
~ 9	112,499	57,377	55,122	51.0:49.0	148,431	73,817	74,614	49.7:50.3
10~19	88,178	43,665	44,513	49.5:50.5	119,636	59,980	59,656	50.1:49.9
20~39	79,060	37,535	41,525	47.5:52.5	129,820	63,608	66,212	49.0:51.0
40~59	51,014	26,678	24,336	52.3:47.7	62,313	31,648	30,665	50.8:49.2
60~	17,867	8,386	9,481	46.9:53.1	27,746	14,277	13,469	51.5:48.5
TOTAL	348,618	173,641	174,977	49.8:50.2	487,946	243,330	244,616	49.9:50.1
RURAL AREA:								
~ 9	83,380	42,756	40,624	51.3:48.7	92,432	45,804	46,628	49.6:50.4
10~19	55,759	25,967	29,792	46.6:53.4	81,351	40,708	40,643	50.1:49.9
20~39	49,460	22,375	27,085	45.2:54.8	73,458	35,369	38,089	48.1:51.9
40~59	34,339	17,872	16,467	52.0:48.0	39,956	19,342	20,614	48.4:51.6
60~	12,088	5,749	6,339	47.6:52.4	17,526	9,659	7,867	55.1:44.9
TOTAL	235,026	114,722	120,304	48.8:51.2	304,723	150,882	153,841	49.5:50.5
URBAN AREA:								
~ 9	29,119	14,621	14,498	50.2:49.8	55,994	28,011	27,983	50.0:50.0
10~19	32,419	17,698	14,721	54.6:45.4	38,277	19,265	19,012	50.3:49.7
20~39	29,600	15,160	14,440	51.2:48.8	56,348	28,238	28,110	50.1:49.9
40~59	16,675	8,806	7,869	52.8:47.2	23,355	12,304	11,051	52.7:47.3
60~	5,779	2,637	3,142	45.6:54.4	9,227	4,616	4,611	50.0:50.0
TOTAL	113,592	58,919	54,673	51.9:48.1	183,213	92,434	90,767	50.5:49.5

TABLE D.1-6 FAMILY SIZE PER HOUSEHOLD IN EX-AMOL & BABOL SHAHRESTANS

	1976			1986		
	Total Population	No. of Household	Family Size	Total Population	No. of Household	Family Size
EX-AMOL SHAHRESTAN						
URBAN AREA	76,061	14,399	5.28	131,323	25,986	5.05
RURAL AREA	156,414	25,781	6.07	201,355	33,239	6.06
TOTAL	232,475	40,180	5.79	332,678	60,225	5.52
EX-BABOL SHAHRESTAN						
URBAN AREA	113,592	23,626	4.81	183,191	38,555	4.75
RURAL AREA	235,026	40,803	5.76	304,745	53,644	5.68
TOTAL	348,618	64,429	5.41	487,936	92,199	5.29

TABLE D.1-7 AGE GROUP POPULATION BY RURAL & URBAN AREAS IN EX-AMOL & BABOL SHAHRESTANS

AGE GROUP	EX-AMOL SHAHRESTAN				EX-BABOL SHAHRESTAN			
	1976		1986		1976		1986	
WHOLE AREA:								
~ 9	77,773	33.5%	99,802	30.0%	112,499	32.3%	148,431	30.4%
10~19	57,055	24.5	82,598	24.8	88,178	25.3	119,636	24.5
20~39	54,775	23.6	92,498	27.8	79,060	22.7	129,820	26.6
40~59	32,282	13.9	40,658	12.2	51,014	14.6	62,313	12.8
60~	10,590	4.5	17,122	5.2	17,867	5.1	27,746	5.7
TOTAL	232,475	100.0%	332,678	100.0%	348,618	100.0%	487,936	100.0%
RURAL AREA:								
~ 9	55,631	35.5%	59,895	29.7%	83,380	35.5%	92,432	30.3%
10~19	36,227	23.2	53,168	26.4	55,759	23.7	81,351	26.7
20~39	35,491	22.7	52,522	26.1	49,460	21.0	73,458	24.1
40~59	21,752	13.9	24,756	12.3	34,339	14.6	39,956	13.1
60~	7,313	4.7	10,987	5.5	12,088	5.2	17,526	5.8
TOTAL	156,414	100.0%	201,328	100.0%	235,026	100.0%	304,723	100.0%
URBAN AREA:								
~ 9	22,142	29.1%	39,907	30.4%	29,119	25.6%	55,994	30.6%
10~19	20,828	27.4	29,430	22.4	32,419	28.5	38,277	20.9
20~39	19,284	25.4	39,976	30.4	29,600	26.1	56,348	30.8
40~59	10,530	13.8	15,902	12.1	16,675	14.7	23,355	12.7
60~	3,277	4.3	6,135	4.7	5,779	5.1	9,227	5.0
TOTAL	76,061	100.0%	131,350	100.0%	113,592	100.0%	183,201	100.0%

D. 2 Man-power

(1) Data Applied

Only available data are the census reports of Shahrestan level in 1976 and 1986.

(2) Analysis

The man-power characteristics in the Project Area are to be assumed from 3 points of employment status, employment by sectors and quality of man-power, which are summarized in the Tables D. 2-1, D. 2-2 and D. 2-3, respectively.

D. 2. 1 Population Distribution by Employment Status

The meaning of Economically Active Population (EAP) in the Table D. 2-2 is assumed as the population willing/allowed to work. From such point of view, the two neighboring Shahrestans of Amol and Babol have notable difference as below:

- * The ratio of EAP to the total population in Amol was increased from 35.3% in 1976 to 38.8% in 1986, but those of in Babol was decreased from 44.5% to 38.9%. The reason is mainly change of women's position in the rural area, viz., 32.7% of female in rural area was the EAP in 1976 but it decreased to 13.2% in 1986. In case of the urban area, female of both Shahrestans showed a trend of increase.
- * The ratio of unemployed in the EAP in 1976 at Amol and Babol were 37.2% and 63.2%, respectively, due to high ratio of unemployed in the rural area, 52.5% in Amol and 82.3 % in Babol. Those figures are not considered as reasonable, but to be assumed that most of rural inhabitant, mainly farmer, are willing to have better employment opportunity in 1976.
- * The actual ratio of unemployed in 1986 were 9.5% in Amol and 10.4% in Babol, but in the rural area were 7.6% and 8.8%, respectively. In case of the urban area, both Shahrestans showed a trend of increase of unemployed.

- * The ratio of employed in total population in the Project Area is shown in the Tables D. 1-2 and D. 1-3. Although some fluctuation was shown by the Dehstan from 21.9-28.0%, the mean ratio was 25%.

D. 2. 2 Population Distribution by Sectors

As shown in Table D. 2-2, 24.9% in Amol and 13.8% in Babol of the employed were engaged in Agriculture, Forestry, Hunting & Fishery Sector in 1976, but those in 1986 were 43.3% and 47.7%. This is most notable change in the two census periods.

Another notable change was No. of employed in Social Services Sector that was more than doubled regardlessly in the rural or urban areas in both Shahrestans.

The increase of No. of employed in Manufacturing Sector were also considerable, it was doubled in Amol, but the ratio were 8.9% in Amol and 7.4% in Babol in 1986.

No. of employed in Retail Dealer, Hotel, Restaurant, etc. were increased considerable especially in the urban area of Amol. But the ratio were 7.6% in Amol and 6.3% in Babol and those in the urban area were 16.3% and 14.3%, respectively.

In general, the changes in Amol Shahrestan was more notable than Babol Shahrestan. In other words, Amol has been developing toward the urban type employment.

D. 2. 3 Illiteracy Ratio by Rural & Urban Areas

The illiteracy ratio is considered as one of the index to assume the quality of man-power.

The illiteracy ratio in over 6 years old population have been decreased regardless to the place of living or sex in both Shahrestans. Those in Amol were 48.7% in 1976 and 34.2% in 1986, and those in Babol were 51.4% in 1976 and 36.0% in 1986.

But, the gap in the living place or sex were still notable, viz., 39.0% of the rural inhabitant in Amol were illiteracy in 1986, but that in urban area was 26.7%. In case of Babol, those ratio were 42.1% and 25.7%, respectively. 25.7% of male and 42.9% of female in Amol were illiteracy in 1986, and those ratio in Babol were 28.9% and 43.1%, respectively.

Tables D. 1-2 and D. 1-3 show the literacy ratio in the Project Area in 1986, and it varies from 40.1% to 51.7% by Dehstan and by Irrigation Zone.

D. 2. 4 Man-power Requirement in the Project

No. of employed in Agriculture Sector in the Project Area is assumed from the No. of employed in the rural area and the ratio of employment by sectors shown in the above Tables D. 1-2 and D. 2-2, respectively. Consequently, the employed in agriculture sector in 1986 is estimated as below:

Ex-Amol area	$41,934 \times 0.666 =$	27,928
Ex-Babol area	$26,755 \times 0.689 =$	18,434
Total		46,362

Note: Above figures of employed include employment in forestry, fishery and hunting other than farming, however No. of non-farming employment is considered as almostly same as farming population in urban area. Therefore above figure of 46,362 is considered as exclusive of non-farming employment.

On the other hand, the rate of population increase in the Project Area in 1976 - 86 was 3.3%. Assuming the rate of absorption in agriculture sector after 1986 as 1.6%, a half of the increase rate of population, the employed in agriculture sector in 1992 will be estimated as 51,000. The present labor demand in agriculture in the Project Area is as shown in Figure D. 2-1, and there are some shortage of labor in mid April- mid-May period and September when the labor demand reach to the peak for transplanting and harvesting.

Figure D. 2-2 shows the labor requirement at the completion of efficient farm mechanization under the Project. In such case, the peak demand will be appeared in May, and total requirement will be about 23,500 men per day or about 46% of that in 1992.

The Project will provide new employment of about 8,500 as detailed below:

Cattle rearing	118,200 head	/	50	=	2,400
Forage preparation	1,993,500 ton*	/	500	=	4,000
Straw preparation	43,900 ton	/	1,000	=	50
Packing of vegetables	53,200 ton	/	100	=	550
Maintenance of					
large agri-machinery	4,560 stand	/	3	=	1,500
					8,500

* in fresh grass weight

Adding such employment to the peak demand of mechanized farming under the Project, there will be a peak labor demand of 32,000 in total, however it is about 63% of assumed employed in 1992. Consequently, additional employment opportunity of 19,000 will be needed even if the increase of employment in the agriculture sector is not expected.

However, it is obvious from Figure D. 2-1 that the employment in agriculture sector is concentrated in transplanting season of April - May and harvesting season of September at present, and such concentration of labor demand is causing the increase of production cost which makes farmer's net income be decreased. Except those peak demand periods, the Project will provide more stable employment opportunity.

To provide employment opportunity for those surplus labor produced from farm mechanization, it is necessary to study more comprehensively taking the potential employment in and out of the Project Area into consideration.

In 1970s, there was a trend of production decrease and stagnation of farming activities in the country due to shortage of man-power, therefore forecasting of labor requirement based on the present employment status which is considered as country-wide stagnation of economical activities will misconduct the real labor demand in the projected year.

It is assumed that the employment opportunity in industry and construction sectors as well as sector of related services will rapidly be increased in accordance with the stabilization of country's economy, therefore the above mentioned surplus labor will also be absorbed in other sectors.

TABLE D.2-1 POPULATION DISTRIBUTION BY EMPLOYMENT STATUS IN EX-AHOL & BABOL SHAHRESTANS

	GRAND TOTAL		ECONOMICALLY ACTIVE POPULATION						ECONOMICALLY INACTIVE POPULATION									
	1976-1986		EMPLOYED		UNEMPLOYED		TOTAL		HOUSE KEEPING		STUDENT		RETIRED		OTHERS			
	1976	1986	1976	1986	1976	1986	1976	1986	1976	1986	1976	1986	1976	1986	1976	1986		
EX-AHOL SHAHRESTAN (WHOLE)																		
TOTAL	154,702	232,876	54,641	90,287	34,299	81,711	20,342	8,576	100,061	142,589	59,988	83,539	33,642	47,900	2,543	2,751	3,888	8,399
MALE	77,701	117,813	52,289	84,012	32,364	77,021	19,925	6,991	25,412	33,801	0	1,031	21,424	26,750	1,775	2,023	2,213	3,997
FEMALE	77,001	115,063	2,352	6,275	1,935	4,690	417	1,585	74,649	108,788	59,988	82,508	12,218	21,150	768	728	1,675	4,402
DO-RURAL AREA																		
TOTAL	100,783	141,433	36,631	53,897	17,410	49,796	19,221	4,101	64,152	87,536	43,125	53,088	18,777	27,506	1,620	1,267	2,630	5,675
MALE	49,675	71,511	35,915	51,498	17,027	47,921	18,888	3,577	13,760	20,013	0	686	11,480	16,153	1,009	849	1,271	2,325
FEMALE	51,108	69,922	716	2,399	383	1,875	333	524	50,392	67,523	43,125	52,402	5,297	11,353	611	418	1,359	3,350
DO-URBAN AREA																		
TOTAL	53,919	91,428	18,010	36,387	16,889	31,912	1,121	4,475	35,909	55,041	16,863	30,444	16,865	20,394	923	1,484	1,258	2,719
MALE	28,026	46,295	16,374	32,511	15,337	29,097	1,037	3,414	11,652	13,784	0	345	9,944	10,597	766	1,174	942	1,688
FEMALE	25,893	45,133	1,636	3,876	1,552	2,815	84	1,061	24,257	41,257	16,863	30,099	6,921	9,797	157	310	316	1,031
EX-BABOL SHAHRESTAN (WHOLE)																		
TOTAL	236,119	339,575	105,133	131,977	38,648	118,266	66,485	13,711	130,986	207,538	66,811	111,025	54,561	74,738	5,859	4,423	3,755	17,352
MALE	116,264	169,513	75,724	112,482	34,093	101,739	41,631	10,743	40,540	57,031	0	5,370	35,441	40,819	3,149	3,066	1,950	7,776
FEMALE	119,855	170,062	29,409	19,495	4,555	16,527	24,854	2,968	90,446	150,507	66,811	105,655	19,120	33,919	2,710	1,357	1,805	9,576
DO-RURAL AREA																		
TOTAL	151,846	212,301	76,431	83,525	13,558	76,206	62,873	7,319	75,215	128,776	42,657	67,685	26,565	46,155	3,785	2,371	2,208	12,555
MALE	71,966	105,088	50,366	69,348	11,918	63,438	38,448	5,910	21,600	35,674	0	3,425	18,910	25,836	1,757	1,430	933	5,049
FEMALE	79,880	107,213	26,065	14,177	1,640	12,768	24,425	1,409	53,615	93,036	42,657	64,280	7,655	20,319	2,028	941	1,275	7,516
DO-URBAN AREA																		
TOTAL	84,473	127,207	28,702	48,444	25,090	42,053	3,612	6,391	55,771	78,763	24,154	43,336	27,996	28,483	2,074	2,052	1,547	4,892
MALE	44,298	64,423	25,358	43,126	22,175	38,294	3,183	4,832	18,940	21,297	0	1,945	16,531	14,883	1,392	1,636	1,017	2,833
FEMALE	40,175	62,784	3,344	5,318	2,915	3,759	429	1,559	36,831	57,466	24,154	41,391	11,465	13,600	682	416	530	2,059

TABLE D.2-2 POPULATION DISTRIBUTION BY SECTORS IN EX-AMOL & BABOL SHAHRESTANS

	EX-AMOL SHAHRESTAN				EX-BABOL SHAHRESTAN			
	1976		1986		1976		1986	
WHOLE AREA:								
AGRICULTURE, FORESTRY,								
HUNTING & FISHERY	8,546	24.9%	35,384	43.3%	5,346	13.8%	56,448	47.7%
MINING	406	1.2	120	0.1	42	0.1	82	0.07
MANUFACTURING	3,895	11.4	7,314	8.9	6,160	15.9	8,756	7.4
CONSTRUCTION	6,678	19.5	6,755	8.3	5,811	15.0	6,651	5.6
ELECTRICITY,								
WATER & GAS	109	0.3	128	0.1	205	0.5	237	0.2
RETAIL DEALER, HOTEL,								
RESTAURANT, ETC.	3,632	10.6	6,253	7.6	5,286	13.7	7,483	6.3
TRANSPORT, STORAGE,								
COMMUNICATION, ETC.	3,164	9.2	3,755	4.6	3,632	9.4	5,755	4.9
FINANCING, INSURANCE,								
TRADING, ETC.	358	1.0	551	0.7	641	1.7	1,051	0.9
SOCIAL SERVICES	7,326	21.4	19,826	24.2	11,442	29.6	28,698	24.2
UNCLASSIFIED	185	0.5	1,691	2.1	83	0.2	3,255	2.7
TOTAL EMPLOYED	34,299	100.0%	81,777	100.0%	38,648	100.0%	118,416	100.0%
RURAL AREA:								
AGRICULTURE, FORESTRY,								
HUNTING & FISHERY	7,466	42.9%	33,200	66.6%	3,799	28.0%	52,583	68.9%
MINING	742	2.0	91	0.2	26	0.2	16	
MANUFACTURING	1,393	8.0	2,976	6.0	2,598	19.2	3,933	5.2
CONSTRUCTION	3,478	20.0	2,087	4.2	2,409	17.8	2,815	3.7
ELECTRICITY,								
WATER & GAS	19	0.1	26	0.1	29	0.2	67	0.1
RETAIL DEALER, HOTEL,								
RESTAURANT, ETC.	1,166	6.7	1,049	2.1	1,324	9.8	1,457	1.9
TRANSPORT, STORAGE,								
COMMUNICATION, ETC.	716	4.1	1,009	2.0	835	6.1	1,762	2.3
FINANCING, INSURANCE,								
TRADING, ETC.	23	0.1	74	0.1	55	0.4	161	0.2
SOCIAL SERVICES	2,688	15.4	8,603	17.3	2,456	18.1	11,990	15.7
UNCLASSIFIED	119	0.7	733	1.4	27	0.2	1,542	2.0
TOTAL EMPLOYED	17,410	100.0%	49,848	100.0%	13,558	100.0%	76,326	100.0%
URBAN AREA:								
AGRICULTURE, FORESTRY,								
HUNTING & FISHERY	1,080	6.4%	2,184	6.8%	1,547	6.2%	3,865	9.2%
MINING	64	0.4	29	0.1	16	0.1	66	0.2
MANUFACTURING	2,502	14.8	4,336	13.6	3,562	14.2	4,823	11.5
CONSTRUCTION	3,200	18.9	4,668	14.6	3,402	13.6	3,831	9.1
ELECTRICITY,								
WATER & GAS	90	0.5	102	0.3	176	0.7	170	0.4
RETAIL DEALER, HOTEL,								
RESTAURANT, ETC.	2,466	14.6	5,203	16.3	3,962	15.8	6,026	14.3
TRANSPORT, STORGE,								
COMMUNICATION, ETC.	2,448	14.5	2,746	8.6	2,797	11.1	3,992	9.5
FINANCING, INSURANCE,								
TRADING, ETC.	335	2.0	477	1.5	586	2.3	890	2.1
SOCIAL SERVICES	4,638	27.5	11,223	35.2	8,986	35.8	16,798	39.7
UNCLASSIFIED	66	0.4	958	3.0	56	0.2	1,712	4.0
TOTAL EMPLOYED	16,889	100.0%	31,926	100.0%	25,090	100.0%	42,083	100.0%

TABLE D.2-3 ILLITERACY RATIO BY RURAL & URBAN AREAS IN EX-AHOL & BABOL SHAHRESTANS

	EX-AHOL SHAHRESTAN				EX-BABOL SHAHRESTAN			
	1976		1986		1976		1986	
WHOLE SHAHRESTAN:								
TOTAL POPULATION OVER 6 YRS.	185,944		267,568		281,566		392,339	
TOTAL ILLITERACY	90,470	48.7%	91,466	34.2%	144,639	51.4%	141,159	36.0%
MALE POPULATION OVER 6 YRS.	93,915		135,407		139,493		196,226	
MALE ILLITERACY	33,702	35.9	34,809	25.7	54,969	39.4	56,663	28.9
FEMALE POPULATION OVER 6 YRS.	92,029		132,161		142,073		196,113	
FEMALE ILLITERACY	56,768	61.7	56,657	42.9	89,670	63.1	84,496	43.1
RURAL AREA:								
POPULATION OVER 6 YRS.	123,087		162,200		185,264		245,871	
TOTAL ILLITERACY	68,752	55.9	63,286	39.0	112,942	61.0	103,522	42.1
MALE POPULATION OVER 6 YRS.	61,329		82,094		89,311		121,928	
MALE ILLITERACY	25,395	41.4	24,066	29.3	42,130	47.2	41,493	34.0
FEMALE POPULATION OVER 6 YRS.	61,758		80,106		95,953		123,943	
FEMALE ILLITERACY	43,357	70.2	39,220	49.0	70,812	73.8	62,029	50.0
URBAN AREA:								
POPULATION OVER 6 YRS.	62,857		105,368		96,302		146,468	
TOTAL ILLITERACY	21,718	34.6	28,180	26.7	31,697	32.9	37,637	25.7
MALE POPULATION OVER 6 YRS.	32,586		53,313		50,182		74,298	
MALE ILLITERACY	8,307	25.5	10,743	20.2	12,839	25.6	15,170	20.4
FEMALE POPULATION OVER 6 YRS.	30,271		52,055		46,120		72,170	
FEMALE ILLITERACY	13,411	44.3	17,437	33.5	18,858	40.9	22,467	31.1

FIGURE D.2-1: PRESENT FARMING LABOR REQUIREMENT
(Unit: man·day)

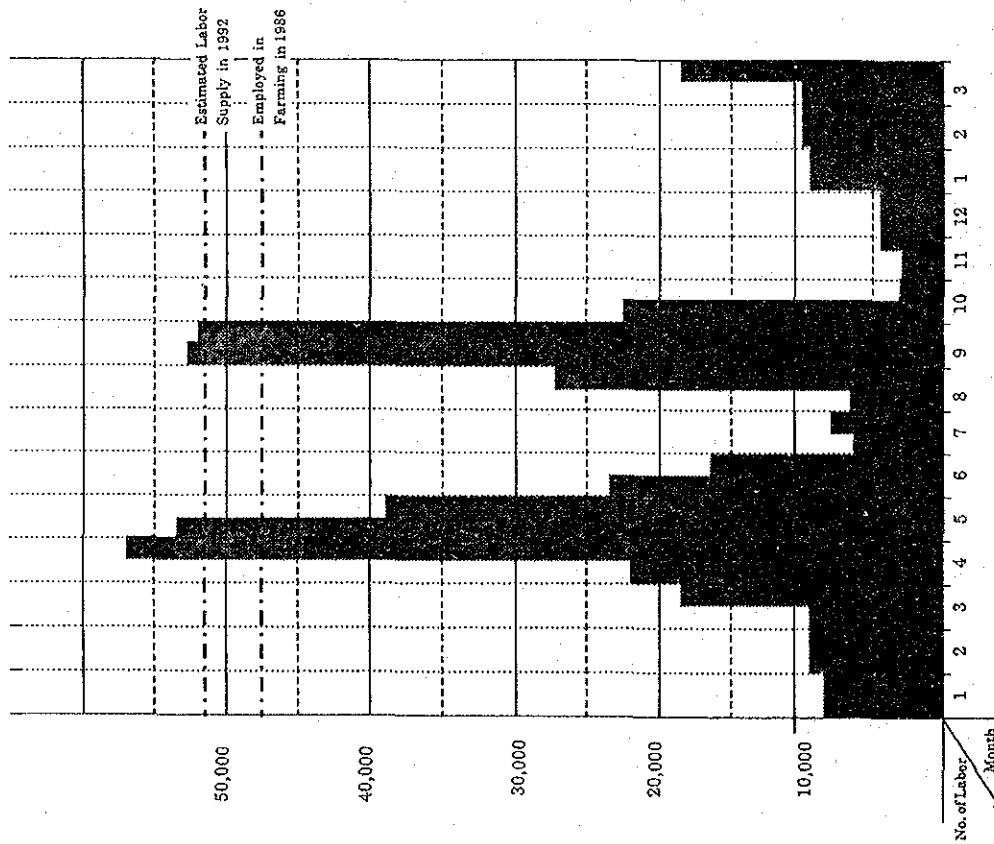
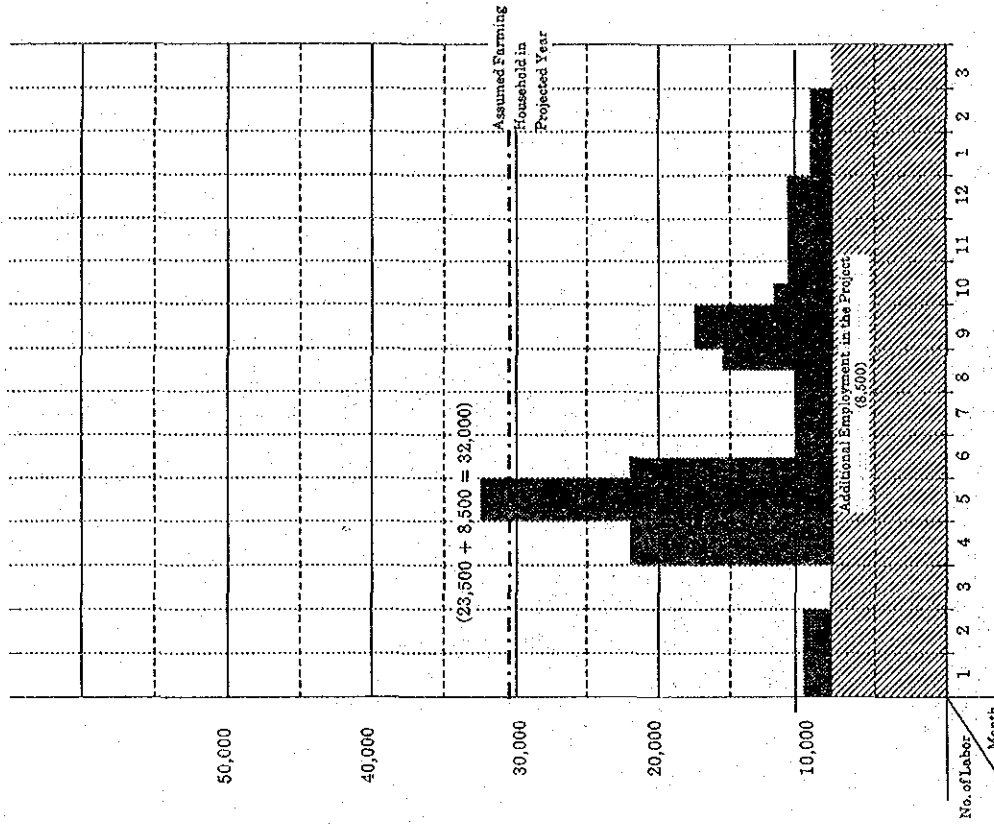


FIGURE D.2-2: FARMING LABOR REQUIREMENT UNDER PROJECT
(Unit: man·day)



D. 3 Rural Institution & Economy

(1) Data Applied

The lists of villages under new administration were supplied by the Farmandar's offices of Amol, Babol and Babolsar. The data related to the rural cooperatives and credit supply from the Bank of Agriculture were supplied by the Shahrestan offices of Cooperative Organization of the MOA in Amol and Babol.

(2) Analysis

All listed villages were plotted on the map, then villages in the Project Area were clarified. 491 villages were counted as villages in the Project Area, 460 villages of which were listed in the Village Gazette.

In the Project Area, change of name of villages are rather popular. Moreover, the concept of Deh (village) and Mahaleh (area) are not clear, therefore the list of villages were provided mainly based on the village Gazette.

Same confusion was observed in the list of member villages of rural cooperatives.

The Registration Offices in the Project Area have registered map of each village, however most of them are not showing present boundary of villages. In many part, the registered village areas were divided into new residential area or Deh, and surrounded forest have been reclaimed into paddy field.

D. 3. 1 List of Villages in the Project Area

The list of villages is shown as the Table D. 3-1, and it is explained as below:

- * The list shows 527 villages, 18 villages of which are located at the vicinity of the Project Area and other 18 villages are not included in

the lists received from the Farmandar's offices, but their statistic data codes are available.

* Following reference codes were applied:

1) Dehstan Code - DN001-DN016 are interpreted as below:

DN001	Chalav	DN010	Emamzadeh Abudallah
DN002	Bala Khiaban Latikuh	DN011	Barik Rud
DN003	Poin Khiaban Latikuh	DN012	Rud Bast
DN004	Dasht Sar		
DN005	Dabu Junubi	DN013	Laleh Abad
DN006	Harazpei Junubi	DN014	Karipei
DN007	Ahahamrostagh	DN015	Getab
DN008	Harazpei Shomali		
DN009	Dabu Shomali	DN016	Mian Rud (Nur)

2) Rural Service Center Code - SC001-SC010 are interpreted as below:

SC001	Chalav	SC006	Jalal Azrak Shomali
SC002	Ahahamrostagh	SC007	Shahid Ashrafi Esfahani
SC003	Dasht Sar	SC008	Poin Ahamad Chalehpei
SC004	Dabu Junubi	SC009	Jalal Azrak Junubi
SC005	Harazpei Shomali	SC010	Laleh Abad

3) Rural Cooperative Code - RC001-RC036 are interpreted as below:

RC001	Golestan	RC013	Alesh	RC025	Omid
RC002	Aghuzbon	RC014	Dabu	RC026	Khazar
RC003	Pishru	RC015	Deh Feri	RC027	Rud Bast
RC004	Bahaman	RC016	Resalat	RC028	Darzi Naghib
RC005	Hendu Kola	RC017	Momtaz	RC029	Pol Ansari
RC006	Mehr	RC018	Haghighat	RC030	Asbu Kola
RC007	Vali Asr	RC019	Talik Sar	RC031	Keshavarz

RC008	Vahadat	RC020	Payam	RC032	Andisheh
RC009	Nima	RC021	Tohid	RC033	Hafez
RC010	Etemad	RC022	Molla Kola	RC034	Pishru
RC011	Taher	RC023	Azadi	RC035	Azadi
RC012	Esfand	RC024	Ettehad	RC036	Hadaf

4) Irrigation District Code are Interpreted As Below:

HW: West District of Haraz Diversion Dam

HE: East District of Haraz Diversion Dam

AW: West District of Amol Diversion Dam

AE: East District of Amol Diversion Dam

VCHW1, VCKR1-2,4, VCKL6: Vicinity of related Irrigation Zone

5) Irrigation Zone Code are as explained in the Chapter of Irrigation/Drainage.

D. 3. 2 Outlook of Rural Cooperatives in the Project Area

Table D. 3-2 shows the outlook of Rural Cooperatives in the Project Area as of the mid of 1991. As shown in Figure 3. 5-2 in the Main Report, some of the listed Cooperatives are including the villages outside of the Project Area, therefore, the rural cooperative system is covering 446 villages or about 91% of total villages in the Project Area.

D. 3. 3 Record of Receipt of Credit from Bank of Agriculture in the Project Area

Table D. 3-3 shows the credit supply of the Bank of Agriculture to the member of Rural Cooperatives from 1356 (1977/78) to 1369 (1990/91).

P.1. TABLE D.3-1 LIST OF VILLAGES IN THE PROJECT AREA BY DEHSTANS

VILLAGE CODE	VILLAGE NAME	REFERENCE CODES						No. of Household	
		Dehstan	Rural Service Center	Rural Cooperative	Irrigation District	Irrigation Zone	1985 MDA	1986 PBO	
014974	Razakeh	DN001		RC001	HW	HWU1	257	208	
014984	Mahadabad	DN001	SC001	RC001	HW	HWU2	110	138	
	Mehdiabad	DN001		RC001	HW	HWU2	40	-	
014959 *	Espanad	DN002	SC001	RC001	VCHW1	VCHW1	40	39	
014960 *	Osku Mahaleh	DN002	SC001	RC001	VCHW1	VCHW1	620	468	
014963	Tiliran	DN002	SC001	RC001	HW	HW1	96	92	
014964	Toskabon	DN002	SC001	RC001	HW	HW3	135	98	
014965	Chalikiadeh	DN002	SC001	RC001	HW	HW2	39	41	
014966	Chandar Mahaleh	DN002	SC001	RC002	HW	HW3	136	108	
014967	Khas Kola	DN002		RC001	HW	HW3	82	81	
014968	Khoshkrud	DN002	SC001	RC001	HW	HW1	60	63	
014970	Darazan	DN002	SC001	RC001	HW	HW3	160	161	
014971 **	Darman Kola	AU	SC001		HW	AU	-	37	
014972	Divroz	DN002	SC001	RC002	HW	HW2	63	65	
014977	Suteh Kola	DN002	SC001	RC002	HW	HW3	125	111	
023124 *	Soheri	DN002	SC001	RC001	VCHW1	VCHW1	27	25	
014979	Aali Jangal	DN002	SC001	RC001	HW	HW2	10	13	
014980	Kasadeh	DN002	SC001	RC001	HW	HW1	140	139	
015045	Karchi Kola	DN002	SC001	RC002	HW	HW3	25	39	
014985	Marzan Kola	DN002	SC001	RC001	HW	HW3	210	174	
014986	Mianrud	DN002	SC001	RC002	HW	HW3	15	15	
014987	Meikhoran	DN002	SC001	RC001	HW	HW3	112	94	
014988	Nogardan	DN002	SC001	RC001	HW	HW3	63	62	
015058	Varandeh	DN002	SC001	RC002	HW	HW2	60	54	
014989	Halumsar	DN002	SC001	RC001	HW	HWU3	125	111	
015023	Aghuzbon	DN003	SC002	RC002	HW	HW2	65	108	
015024	Ashuz keti	DN003	SC002		HW	HW4	41	52	
015025	Anji Pol	DN003	SC002	RC002	HW	HW2	42	44	
015026 **	Ansari Mahaleh	AU	SC002		HW	AU	9	12	
015027	Ahan Ketl	DN003	SC002	RC003	HW	HW4	21	20	
015029	Pishgun	DN003	SC002	RC003	HW	HW3	35	38	
015030	Tazehabad	DN003	SC002	RC003	HW	HW2	51	42	
015032	Tajanjar-olia	DN003	SC002	RC002	HW	HW3	130	140	
015031	Tajanjar Sofla	DN003	SC002	RC002	HW	HW3	76	84	
015481	Tajnak	DN003	SC002	RC003	HW	HW3	60	84	
015033	Cheshmehsar	DN003	SC002		HW	HW4	-	9	
015034	Changaz	DN003	SC002	RC002	HW	HW2	75	83	
015035	Hosseinaabad	DN003	SC002	RC003	HW	HW3	-	142	
015036	Darkapei	DN003	SC002	RC003	HW	HW2	37	38	
015491	Dar Kola	DN003	SC002	RC003	HW	HW4	87	95	
015037	Rukesh	DN003	SC002	RC003	HW	HW3	48	49	
	Reks Farm	DN003			HW	-	-	-	

VILLAGE CODE	VILLAGE NAME	REFERENCE CODES						No. of household	
		Dehstan	Rural Service Center	Rural Cooperative	Irrigation District	Irrigation Zone	1985 MOA	1986 PBO	
015038	Zarvande	DN003	SC002	RC002	HW	HW3	28	52	
015039	Saej Mahaleh	DN003	SC002	RC002	HW	HW2	190	200	
015040	Sarhang Ket	DN003	SC002	RC003	HW	HW3	40	35	
015041	Shah Lash	DN003	SC002	RC003	HW	HW2	80	60	
015042	Shah Mahaleh	DN003	SC002	RC002	HW	AU	20	57	
015043	Shir Kaj	DN003	SC002	RC003	HW	HW2	14	10	
015044	Chajar Mahaleh	DN003	SC002	RC003	HW	HW4	33	39	
015046	Kaseb Mahaleh	DN003	SC002	RC003	HW	HW3	53	48	
015047	Kord Ket	DN003	SC002	RC003	HW	HW4	18	20	
015048	Kelaksar Sofla	DN003	SC002	RC003	HW	AU	165	248	
015049	Xusehraz	DN003	SC002	RC003	HW	HW2	100	100	
015050	Xukdeh	DN003	SC002	RC003	HW	HW2	150	137	
015051	Kinebar Khast Ket	DN003	SC002	RC002	HW	HW2	63	55	
015052	Gelan	DN003	SC002	RC003	HW	HW4	40	36	
015053	Mar Ket	DN003	SC002	RC003	HW	HW3	40	36	
015054	Marandeh	DN003	SC002	RC003	HW	HW3	50	63	
015055	Maskun	DN003	SC002	RC003	HW	HW2	4	4	
015056	Norom	DN003	SC002	RC002	HW	HW2	62	53	
015057	Noabad	DN003	SC002	RC002	HW	HW2	86	103	
015060	Yalidsheh	DN003	SC002	RC003	HW	HW2	109	129	
015058	Varkadeh	DN003	SC002	RC003	HW	HW4	99	94	
015061	Heli Ket	DN003	SC002	RC003	HW	HW2	191	108	
023021	Shir Kola	DN015			HW	HW2	400	434	
023028	Masumabad	DN015			HW	HW2	17	18	
015300	Ejibar Kola	DN004	SC003	RC004	HE	HE5	17	9	
015302	Aliah Kaj	DN004	SC003	RC005	HE	HE4	-	-	
015304	Rice Research Station	DN004	SC003		HE	HE4	-	-	
	Azar Ket	DN004			HE		-	-	
	Anhilek Farm	DN004	SC003		HE		-	-	
015305	Baghban Kola	DN004	SC003	RC007	HE	HE4	60	46	
015307	Bazainan	DN004	SC003	RC008	HE	HE3	220	185	
015308	Buran	DN004	SC003	RC009	HE	HE1	393	377	
015309	Pasha Kola	DN004	SC003	RC008	HE	KL2	185	229	
015312	Palak Sofla	DN004	SC003	RC009	HE	AU	114	127	
015313	Palak Olla	DN004	SC003	RC009	HE	AU	65	87	
015315	Tork Kola	DN004	SC003	RC009	HE	HE1	143	152	
017174	Tir Kola	DN004	SC003	RC009	HE	XR3	17	33	
017173	Tamsak	DN004	SC003		HE	XR3	233	191	
	Jadidabad Farm	DN004	SC003		HE		-	-	
017177	Changmian	DN004	SC003	RC029	HE	XR3	100	94	
	Chabasi Farm	DN004	SC003		HE		-	-	
	Khonisar Farm	DN004	SC003		HE		38	-	
015317	Kharmn Kola	DN004	SC003	RC029	HE	XR3	40	39	

VILLAGE CODE	VILLAGE NAME	REFERENCE CODES						No. of household	
		Dehsten	Rural Service Center	Rural Cooperative	Irrigation District	Irrigation Zone	1985 MOA	1986 P80	
015318	Davud Kola	DN004	SC003	RC004	HE	HE5	77	89	
	Doctor Kola Farm	DN004	SC003		HE		-	-	
015321	Dariabari	DN004			HE	HE4	-	28	
015322	Rostandar Mahale	DN004	SC003	RC007	HE	HE5	18	11	
015324	Rudbar	DN004	SC003		HE	HE1	92	99	
015325 *	Zavarak	DN004	SC003	RC008	VCKR2	VCKR2	59	56	
015326 *	Ziaru	DN004	SC003	RC008	VCKR1	VCKR1	59	43	
	Sutehzar	DN004			HE		-	-	
015327	Salar Mahaleh	DN004	SC003	RC005	HE	HE2	57	59	
017187	Sorkh Kola	DN004	SC003		HE	KR4	195	231	
015328 **	Shad Mahaleh	AU			HE	AU	-	125	
015330 *	Shaneh Kola	DN004	SC003	RC008	VCKR2	VCKR2	239	186	
015332	Arab Kheil	DN004	SC003	RC007	HE	HE4	45	48	
015333	Firuz Kola Sofla	DN004	SC003	RC008	HE	HE3	135	162	
015334	Firuz Kola Olla	DN004	SC003	RC008	HE	HE3	124	124	
015335	Firuz Kola Vasat	DN004	SC003	RC008	HE	HE3	73	65	
015336	Chaleh Kosh	DN004	SC003	RC007	HE	HE4	190	165	
015337	Chalilan Kola Sof	DN004	SC003	RC007	HE	HE4	14	14	
015338	Chalilan Kola Olla	DN004	SC003	RC007	HE	HE4	38	40	
	Kelileh	DN004			HE		-	-	
	Kimehsar Farm	DN004			HE		-	-	
	Ketiposht Sofla	DN004	SC003	RC009	HE	HE2	224	240	
015339	K.P. Abbakhshan							(77)	
015340	K.P. Paski Mahaleh							(58)	
015341	K.P. Tirkan							(60)	
015343	K.P. Mian Mahaleh							(45)	
015342	Ketiposht Olla	DN004	SC003	RC009	HE	HE2	121	119	
015345 *	Kowdarreh	DN004	SC003	RC008	VCKR2	VCKR2	257	234	
015346	Konsi	DN004	SC003	RC009	HE	AU	120	126	
015347	Kom Kola	DN004	SC003	RC008	HE	KL1	52	61	
017198	Golmazar Farm	DN004	SC003		HE	KR3	18	17	
	Lelehzar	DN004			HE		-	-	
	Moalew Kola	DN004	SC003	RC008	HE	KR2	148	-	
015349	Mahmadabad	DN004	SC003		HE	KR1	13	16	
015351	Mehdi Kheil	DN004	SC003	RC008	HE	HE5	116	141	
	Mian Ketil	DN004			HE		-	-	
015352	Mileh	DN004	SC003	RC008	HE	KR3	147	169	
	Nafer Kheil	DN004	SC003		HE	KR2	-	-	
015354	Nezamabad	DN004	SC003	RC006	HE	HE5	100	102	
015355	Noabad	DN004	SC003		HE		-	140	
017205	Nodeh	DN004	SC003	RC029	HE	KR3	-	101	
	Najjar Mahaleh	DN004	SC003		HE	HE5	130	-	
015358	Harun Kola	DN004	SC003	RC004	HE	HE4	168	245	
015359	Hendu Kola	DN004	SC003	RC005	HE	HE2	243	299	
	Ebrahimabad	DN005	SC004		HE		-	-	