

Table VII- 12  
Sheet 1

Net Return \*\*\*\* Alternative 1, 1st Year \*\*\*\*

- Economic Price -

Kind of Crop	Net Return per ha (TL/ha)	Unit 1		Unit 2		Unit 3	
		Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)
Wheat	204,179	2,770	565,576	3,529	720,548	3,359	685,837
Barley	85,987	461	39,640	588	50,560	921	79,194
Suger beet	767,772	2,077	1,594,662	2,646	2,031,525	1,835	1,408,862
Dry bean	692,242	2,886	1,997,810	3,675	2,543,989	2,544	1,761,064
Sunflower	631,343	577	364,285	735	464,037	538	339,663
Potatoes	581,130	461	267,901	588	341,704	416	241,750
Vegetables	1,508,772	347	523,544	441	665,368	293	442,070
Alfalfa	667,192	692	461,697	882	588,463	1,021	681,203
Fruit (Existing)	2,603,297	139	361,858	177	460,784	97	252,520
Fruit (new)	- 500,703	553	- 276,889	705	- 352,996	635	- 317,946
Grape (Existing)	1,483,313	168	249,197	214	317,429	222	329,295
Grape (new)	- 465,437	63	- 29,323	80	- 37,235	21	- 9,774
Poplar (Existing)	1,579,960	141	222,774	180	284,393	121	191,175
Poplar (new)	- 117,250	206	- 24,154	261	- 30,602	173	- 20,284
Wheat Straw	105,000 ( 2,770)		290,850 ( 3,529)		370,545 ( 3,359)		352,695
Barley Straw	120,000 ( 461)		55,320 ( 588)		70,560 ( 921)		110,520
Dry bean Stalk	157,500 ( 2,886)		454,545 ( 3,675)		578,813 ( 2,544)		400,680
<b>Total</b>		<b>11,541</b>	<b>7,119,293</b>	<b>14,701</b>	<b>8,767,885</b>	<b>12,196</b>	<b>6,928,524</b>

Note: Year after completion of construction of each unit area

Net Return \*\*\*\* Alternative 1, 2nd Year \*\*\*\*

- Economic Price -

Kind of Crop	Net Return per ha (TL/ha)	Unit 1		Unit 2		Unit 3	
		Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)
Wheat	351,879	2,770	974,705	3,529	1,241,781	3,359	1,181,962
Barley	192,387	461	88,690	588	113,124	921	177,188
Suger beet	1,061,772	2,077	2,205,300	2,646	2,809,449	1,835	1,948,352
Dry bean	814,042	2,886	2,349,325	3,675	2,991,604	2,544	2,070,923
Sunflower	911,343	577	525,845	735	669,837	538	490,303
Potatoes	751,130	461	346,271	588	441,664	416	312,470
Vegetables	2,116,772	347	734,520	441	933,496	293	620,214
Alfalfa	757,192	692	523,977	882	667,843	1,021	773,093
Fruit (Existing)	3,203,297	139	445,258	177	566,984	97	310,720
Fruit (new)	- 396,703	553	- 219,377	705	- 279,676	635	- 251,906
Grape (Existing)	1,983,313	168	333,197	214	424,429	222	440,295
Grape (new)	- 516,687	63	- 32,551	80	- 41,335	21	- 10,850
Poplar (Existing)	1,954,960	141	275,649	180	351,893	121	236,550
Poplar (new)	- 220,040	206	- 45,328	261	- 57,430	173	- 38,067
Wheat Straw	140,000 ( 2,770)		384,800 ( 3,529)		494,060 ( 3,359)		470,260
Barley Straw	160,000 ( 461)		73,760 ( 588)		94,080 ( 921)		147,360
Dry bean Stalk	172,500 ( 2,886)		497,835 ( 3,675)		633,938 ( 2,544)		438,840
<b>Total</b>		<b>11,541</b>	<b>9,464,876</b>	<b>14,701</b>	<b>12,055,741</b>	<b>12,196</b>	<b>9,317,707</b>

Table VII- 12  
Sheet 2

Net Return \*\*\*\* Alternative 1, 3rd Year \*\*\*\* - Economic Price -

Kind of Crop	Net Return per ha (TL/ha)	Unit 1		Unit 2		Unit 3	
		Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)
Wheat	499,579	2,770	1,383,834	3,529	1,763,014	3,359	1,678,086
Barley	298,787	461	137,741	588	175,687	921	275,183
Suger beet	1,355,772	2,077	2,815,938	2,646	3,587,373	1,835	2,487,842
Dry bean	935,842	2,886	2,700,840	3,675	3,439,219	2,544	2,380,782
Sunflower	1,231,343	577	710,485	735	905,037	538	662,463
Potatoes	911,130	461	420,031	588	535,744	416	379,030
Vegetables	2,740,772	347	951,048	441	1,208,680	293	803,046
Alfalfa	847,192	692	586,257	882	747,223	1,021	864,983
Fruit (Existing)	3,803,297	139	528,658	177	673,184	97	368,920
Fruit (new)	- 396,703	553	- 219,377	705	- 279,676	635	- 251,906
Grape (Existing)	2,483,313	168	417,197	214	531,429	222	551,295
Grape (new)	483,313	63	30,449	80	38,665	21	10,150
Poplar (Existing)	2,404,960	141	339,099	180	432,893	121	291,000
Poplar (new)	- 220,040	206	- 45,328	261	- 57,430	173	- 38,067
Wheat Straw	175,000 ( 2,770)		484,750 ( 3,529)		617,575 ( 3,359)		587,825
Barley Straw	200,000 ( 461)		92,200 ( 588)		117,600 ( 921)		184,200
Dry bean Stalk	187,500 ( 2,886)		541,125 ( 3,675)		689,063 ( 2,544)		477,000
Total		11,541	11,874,947	14,701	15,125,280	12,196	11,711,832

Net Return \*\*\*\* Alternative 1, 4th Year \*\*\*\* - Economic Price -

Kind of Crop	Net Return per ha (TL/ha)	Unit 1		Unit 2		Unit 3	
		Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)
Wheat	499,579	2,770	1,383,834	3,529	1,763,014	3,359	1,678,086
Barley	298,787	461	137,741	588	175,687	921	275,183
Suger beet	1,355,772	2,077	2,815,938	2,646	3,587,373	1,835	2,487,842
Dry bean	935,842	2,886	2,700,840	3,675	3,439,219	2,544	2,380,782
Sunflower	1,231,343	577	710,485	735	905,037	538	662,463
Potatoes	911,130	461	420,031	588	535,744	416	379,030
Vegetables	2,740,772	347	951,048	441	1,208,680	293	803,046
Alfalfa	847,192	692	586,257	882	747,223	1,021	864,983
Fruit (Existing)	3,803,297	139	528,658	177	673,184	97	368,920
Fruit (new)	- 396,703	553	- 219,377	705	- 279,676	635	- 251,906
Grape (Existing)	2,483,313	168	417,197	214	531,429	222	551,295
Grape (new)	983,313	63	61,949	80	78,665	21	20,650
Poplar (Existing)	2,404,960	141	339,099	180	432,893	121	291,000
Poplar (new)	- 220,040	206	- 45,328	261	- 57,430	173	- 38,067
Wheat Straw	175,000 ( 2,770)		484,750 ( 3,529)		617,575 ( 3,359)		587,825
Barley Straw	200,000 ( 461)		92,200 ( 588)		117,600 ( 921)		184,200
Dry bean Stalk	187,500 ( 2,886)		541,125 ( 3,675)		689,063 ( 2,544)		477,000
Total		11,541	11,906,447	14,701	15,165,280	12,196	11,722,332

Table VIII- 12  
Sheet 3

Net Return \*\*\*\* Alternative 1, 5th Year \*\*\*\*

- Economic Price -

Kind of Crop	Net Return per ha (TL/ha)	Unit 1		Unit 2		Unit 3	
		Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)
Wheat	499,579	2,770	1,383,834	3,529	1,763,014	3,359	1,678,086
Barley	298,787	461	137,741	588	175,687	921	275,183
Suger beet	1,355,772	2,077	2,815,938	2,646	3,587,373	1,835	2,487,842
Dry bean	935,842	2,886	2,700,840	3,675	3,439,219	2,544	2,380,782
Sunflower	1,231,343	577	710,485	735	905,037	538	662,463
Potatoes	911,130	461	420,031	588	535,744	416	379,030
Vegetables	2,740,772	347	951,048	441	1,208,680	293	803,046
Alfalfa	847,192	692	586,257	882	747,223	1,021	864,983
Fruit (Existing)	3,803,297	139	528,658	177	673,184	97	368,920
Fruit (new)	- 396,703	553	- 219,377	705	- 279,676	635	- 251,906
Grape (Existing)	2,483,313	168	417,197	214	531,429	222	551,295
Grape (new)	1,483,313	63	93,449	80	118,665	21	31,150
Poplar (Existing)	2,404,960	141	339,099	180	432,893	121	291,000
Poplar (new)	- 220,040	206	- 45,328	261	- 57,430	173	- 38,067
Wheat Straw	175,000 ( 2,770)		484,750 ( 3,529)		617,575 ( 3,359)		587,825
Barley Straw	200,000 ( 461)		92,200 ( 588)		117,600 ( 921)		184,200
Dry bean Stalk	187,500 ( 2,886)		541,125 ( 3,675)		689,063 ( 2,544)		477,000
<b>Total</b>		<b>11,541</b>	<b>11,937,947</b>	<b>14,701</b>	<b>15,205,280</b>	<b>12,196</b>	<b>11,732,832</b>

Net Return \*\*\*\* Alternative 1, 6th Year \*\*\*\*

- Economic Price -

Kind of Crop	Net Return per ha (TL/ha)	Unit 1		Unit 2		Unit 3	
		Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)
Wheat	499,579	2,770	1,383,834	3,529	1,763,014	3,359	1,678,086
Barley	298,787	461	137,741	588	175,687	921	275,183
Suger beet	1,355,772	2,077	2,815,938	2,646	3,587,373	1,835	2,487,842
Dry bean	935,842	2,886	2,700,840	3,675	3,439,219	2,544	2,380,782
Sunflower	1,231,343	577	710,485	735	905,037	538	662,463
Potatoes	911,130	461	420,031	588	535,744	416	379,030
Vegetables	2,740,772	347	951,048	441	1,208,680	293	803,046
Alfalfa	847,192	692	586,257	882	747,223	1,021	864,983
Fruit (Existing)	3,803,297	139	528,658	177	673,184	97	368,920
Fruit (new)	- 396,703	553	- 219,377	705	- 279,676	635	- 251,906
Grape	2,483,313	231	573,645	294	730,094	243	603,445
Poplar	2,404,960	347	834,521	441	1,060,587	294	707,058
Wheat Straw	175,000 ( 2,770)		484,750 ( 3,529)		617,575 ( 3,359)		587,825
Barley Straw	200,000 ( 461)		92,200 ( 588)		117,600 ( 921)		184,200
Dry bean Stalk	187,500 ( 2,886)		541,125 ( 3,675)		689,063 ( 2,544)		477,000
<b>Total</b>		<b>11,541</b>	<b>12,541,696</b>	<b>14,701</b>	<b>15,970,404</b>	<b>12,196</b>	<b>12,207,957</b>

Table VI- 12  
Sheet 4

Net Return \*\*\*\* Alternative 1, 7th Year \*\*\*\*

- Economic Price -

Kind of Crop	Net Return per ha (TL/ha)	Unit 1		Unit 2		Unit 3	
		Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)
Wheat	499,579	2,770	1,383,834	3,529	1,763,014	3,359	1,678,086
Barley	298,787	461	137,741	588	175,687	921	275,183
Suger beet	1,355,772	2,077	2,815,938	2,646	3,587,373	1,835	2,487,842
Dry bean	935,842	2,886	2,700,840	3,675	3,439,219	2,544	2,380,782
Sunflower	1,231,343	577	710,485	735	905,037	538	662,463
Potatoes	911,130	461	420,031	588	535,744	416	379,030
Vegetables	2,740,772	347	951,048	441	1,208,680	293	803,046
Alfalfa	847,192	692	586,257	882	747,223	1,021	864,983
Fruit (Existing)	3,803,297	139	528,658	177	673,184	97	368,920
Fruit (new)	1,603,297	553	886,623	705	1,130,324	635	1,018,094
Grape	2,483,313	231	573,645	294	730,094	243	603,445
Poplar	2,404,960	347	834,521	441	1,060,587	294	707,058
Wheat Straw	175,000 ( 2,770)		484,750 ( 3,529)		617,575 ( 3,359)		587,825
Barley Straw	200,000 ( 461)		92,200 ( 588)		117,600 ( 921)		184,200
Dry bean Stalk	187,500 ( 2,886)		541,125 ( 3,675)		689,063 ( 2,544)		477,000
Total		11,541	13,647,696	14,701	17,380,404	12,196	13,477,957

Net Return \*\*\*\* Alternative 1, 8th Year \*\*\*\*

- Economic Price -

Kind of Crop	Net Return per ha (TL/ha)	Unit 1		Unit 2		Unit 3	
		Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)
Wheat	499,579	2,770	1,383,834	3,529	1,763,014	3,359	1,678,086
Barley	298,787	461	137,741	588	175,687	921	275,183
Suger beet	1,355,772	2,077	2,815,938	2,646	3,587,373	1,835	2,487,842
Dry bean	935,842	2,886	2,700,840	3,675	3,439,219	2,544	2,380,782
Sunflower	1,231,343	577	710,485	735	905,037	538	662,463
Potatoes	911,130	461	420,031	588	535,744	416	379,030
Vegetables	2,740,772	347	951,048	441	1,208,680	293	803,046
Alfalfa	847,192	692	586,257	882	747,223	1,021	864,983
Fruit (Existing)	3,803,297	139	528,658	177	673,184	97	368,920
Fruit (new)	2,203,297	553	1,218,423	705	1,553,324	635	1,399,094
Grape	2,483,313	231	573,645	294	730,094	243	603,445
Poplar	2,404,960	347	834,521	441	1,060,587	294	707,058
Wheat Straw	175,000 ( 2,770)		484,750 ( 3,529)		617,575 ( 3,359)		587,825
Barley Straw	200,000 ( 461)		92,200 ( 588)		117,600 ( 921)		184,200
Dry bean Stalk	187,500 ( 2,886)		541,125 ( 3,675)		689,063 ( 2,544)		477,000
Total		11,541	13,979,496	14,701	17,803,404	12,196	13,858,957

Table VII- 12  
Sheet 5

Net Return \*\*\*\* Alternative 1, 9th Year \*\*\*\*

- Economic Price -

Kind of Crop	Net Return per ha (TL/ha)	Unit 1		Unit 2		Unit 3	
		Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)
Wheat	499,579	2,770	1,383,834	3,529	1,763,014	3,359	1,678,086
Barley	298,787	461	137,741	588	175,687	921	275,183
Suger beet	1,355,772	2,077	2,815,938	2,646	3,587,373	1,835	2,487,842
Dry bean	935,842	2,886	2,700,840	3,675	3,439,219	2,544	2,380,782
Sunflower	1,231,343	577	710,485	735	905,037	538	662,463
Potatoes	911,130	461	420,031	588	535,744	416	379,030
Vegetables	2,740,772	347	951,048	441	1,208,680	293	803,046
Alfalfa	847,192	692	586,257	882	747,223	1,021	864,983
Fruit (Existing)	3,803,297	139	528,658	177	673,184	97	368,920
Fruit (new)	3,003,297	553	1,660,823	705	2,117,324	635	1,907,094
Grape	2,483,313	231	573,645	294	730,094	243	603,445
Poplar	2,404,960	347	834,521	441	1,060,587	294	707,058
Wheat Straw	175,000 ( 2,770)		484,750 ( 3,529)		617,575 ( 3,359)		587,825
Barley Straw	200,000 ( 461)		92,200 ( 588)		117,600 ( 921)		184,200
Dry bean Stalk	187,500 ( 2,886)		541,125 ( 3,675)		689,063 ( 2,544)		477,000
Total		11,541	14,421,896	14,701	18,367,404	12,196	14,366,957

Net Return \*\*\*\* Alternative 1, 10th Year ~ \*\*\*\*

- Economic Price -

Kind of Crop	Net Return per ha (TL/ha)	Unit 1		Unit 2		Unit 3	
		Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)	Area (ha)	Net Return (1,000TL)
Wheat	499,579	2,770	1,383,834	3,529	1,763,014	3,359	1,678,086
Barley	298,787	461	137,741	588	175,687	921	275,183
Suger beet	1,355,772	2,077	2,815,938	2,646	3,587,373	1,835	2,487,842
Dry bean	935,842	2,886	2,700,840	3,675	3,439,219	2,544	2,380,782
Sunflower	1,231,343	577	710,485	735	905,037	538	662,463
Potatoes	911,130	461	420,031	588	535,744	416	379,030
Vegetables	2,740,772	347	951,048	441	1,208,680	293	803,046
Alfalfa	847,192	692	586,257	882	747,223	1,021	864,983
Fruit	3,803,297	692	2,631,882	882	3,354,508	732	2,784,013
Grape	2,483,313	231	573,645	294	730,094	243	603,445
Poplar	2,404,960	347	834,521	441	1,060,587	294	707,058
Wheat Straw	175,000 ( 2,770)		484,750 ( 3,529)		617,575 ( 3,359)		587,825
Barley Straw	200,000 ( 461)		92,200 ( 588)		117,600 ( 921)		184,200
Dry bean Stalk	187,500 ( 2,886)		541,125 ( 3,675)		689,063 ( 2,544)		477,000
Total		11,541	14,864,297	14,701	18,931,404	12,196	14,874,956

Note, 1: Year after completion of construction of each unit area

Table VII- 13

- Economic Price -

Net Return \*\*\*\* Alternative 2 \*\*\*\*

Kind of Crop	Area (ha)	1st Year		2nd Year		3rd Year		4th Year		5th Year	
		(TL/ha)	(L.000TL)	(TL/ha)	(L.000TL)	(TL/ha)	(L.000TL)	(TL/ha)	(L.000TL)	(TL/ha)	(L.000TL)
Wheat	7,492	204,179	1,529,709	351,879	2,636,277	499,579	3,742,846	499,579	3,742,846	499,579	3,742,846
Barley	1,248	85,987	107,312	192,387	240,099	298,787	372,886	298,787	372,886	298,787	372,886
Sugar beet	5,619	767,772	4,314,111	1,061,772	5,956,097	1,355,772	7,618,083	1,355,772	7,618,083	1,355,772	7,618,083
Dry bean	7,805	692,242	5,402,949	814,042	6,353,598	935,842	7,304,247	935,842	7,304,247	935,842	7,304,247
Sunflower	1,561	631,343	985,526	911,343	1,422,606	1,231,343	1,922,126	1,231,343	1,922,126	1,231,343	1,922,126
Potatoes	1,248	581,130	725,250	751,130	937,410	911,130	1,137,090	911,130	1,137,090	911,130	1,137,090
Vegetables	937	1,508,772	1,413,719	2,116,772	1,983,415	2,740,772	2,568,103	2,740,772	2,568,103	2,740,772	2,568,103
Alfalfa	1,873	667,192	1,249,651	757,192	1,418,221	847,192	1,586,791	847,192	1,586,791	847,192	1,586,791
Fruit (Existing)	376	2,603,297	978,840	3,203,297	1,204,440	3,803,297	1,430,040	3,803,297	1,430,040	3,803,297	1,430,040
Fruit (new)	1,497	- 500,703	- 749,552	- 396,703	- 593,864	- 396,703	- 593,864	- 396,703	- 593,864	- 396,703	- 593,864
Grape (Existing)	455	1,483,313	674,907	1,983,313	902,407	2,483,313	1,129,907	2,483,313	1,129,907	2,483,313	1,129,907
Grape (new)	169	- 465,437	- 78,559	- 516,687	- 87,320	483,313	81,680	983,313	166,180	1,483,313	250,680
Poplar (Existing)	382	1,579,960	603,545	1,954,960	746,795	2,404,960	918,695	2,404,960	918,695	2,404,960	918,695
Poplar (new)	556	- 117,250	- 65,191	- 220,040	- 122,342	- 220,040	- 122,342	- 220,040	- 122,342	- 220,040	- 122,342
Wheat Straw	( 7,492)	105,000	768,660	140,000	1,048,880	175,000	1,311,100	175,000	1,311,100	175,000	1,311,100
Barley Straw	( 1,248)	120,000	149,760	160,000	199,680	200,000	249,600	200,000	249,600	200,000	249,600
Dry bean Stalk	( 7,805)	157,500	1,229,288	172,500	1,346,363	187,500	1,463,438	187,500	1,463,438	187,500	1,463,438
Total	31,218	19,277,825	7,119,250	25,602,762	32,120,426	32,204,926	32,289,426	32,204,926	32,289,426	32,204,926	32,289,426

Note: Year after completion of construction of the project

Kind of Crop	Area (ha)	6th Year		7th Year		8th Year		9th Year		10th Year	
		(TL/ha)	(L.000TL)	(TL/ha)	(L.000TL)	(TL/ha)	(L.000TL)	(TL/ha)	(L.000TL)	(TL/ha)	(L.000TL)
Wheat	7,492	499,579	3,742,846	499,579	3,742,846	499,579	3,742,846	499,579	3,742,846	499,579	3,742,846
Barley	1,248	298,787	372,886	298,787	372,886	298,787	372,886	298,787	372,886	298,787	372,886
Sugar beet	5,619	1,355,772	7,618,083	1,355,772	7,618,083	1,355,772	7,618,083	1,355,772	7,618,083	1,355,772	7,618,083
Dry bean	7,805	935,842	7,304,247	935,842	7,304,247	935,842	7,304,247	935,842	7,304,247	935,842	7,304,247
Sunflower	1,561	1,231,343	1,922,126	1,231,343	1,922,126	1,231,343	1,922,126	1,231,343	1,922,126	1,231,343	1,922,126
Potatoes	1,248	911,130	1,137,090	911,130	1,137,090	911,130	1,137,090	911,130	1,137,090	911,130	1,137,090
Vegetables	937	2,740,772	2,568,103	2,740,772	2,568,103	2,740,772	2,568,103	2,740,772	2,568,103	2,740,772	2,568,103
Alfalfa	1,873	847,192	1,586,791	847,192	1,586,791	847,192	1,586,791	847,192	1,586,791	847,192	1,586,791
Fruit (Existing)	376	3,803,297	1,430,040	3,803,297	1,430,040	3,803,297	1,430,040	3,803,297	1,430,040	3,803,297	1,430,040
Fruit (new)	1,497	- 396,703	- 593,864	- 396,703	- 593,864	- 396,703	- 593,864	- 396,703	- 593,864	- 396,703	- 593,864
Grape	624	2,483,313	1,549,587	2,483,313	1,549,587	2,483,313	1,549,587	2,483,313	1,549,587	2,483,313	1,549,587
Poplar	938	2,404,960	2,255,852	2,404,960	2,255,852	2,404,960	2,255,852	2,404,960	2,255,852	2,404,960	2,255,852
Wheat Straw	( 7,492)	175,000	1,311,100	175,000	1,311,100	175,000	1,311,100	175,000	1,311,100	175,000	1,311,100
Barley Straw	( 1,248)	200,000	249,600	200,000	249,600	200,000	249,600	200,000	249,600	200,000	249,600
Dry bean Stalk	( 7,805)	187,500	1,463,438	187,500	1,463,438	187,500	1,463,438	187,500	1,463,438	187,500	1,463,438
Total	31,218	33,917,925	36,911,925	37,810,125	39,007,725	39,007,725	39,007,725	39,007,725	39,007,725	39,007,725	39,007,725

Table W- 14  
Sheet 1

- Economic Price -

\*\*\* Alternative 3 \*\*\*

Net Return

Kind of Crop	(Unit: 1.000TL)												
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th
Wheat	4,345,950	6,188,144	6,553,477	4,824,934	4,824,934	4,824,934	4,824,934	4,824,934	4,824,934	4,824,934	4,824,934	4,824,934	4,824,934
Barley	526,842	808,987	911,898	588,610	588,610	588,610	588,610	588,610	588,610	588,610	588,610	588,610	588,610
Suger beet	1,898,700	2,625,762	3,352,824	3,352,824	3,352,824	3,352,824	3,352,824	3,352,824	3,352,824	3,352,824	3,352,824	3,352,824	3,352,824
	296,360	409,844	523,328	523,328	523,328	523,328	523,328	523,328	523,328	523,328	523,328	523,328	523,328
	884,473	1,223,161	1,561,849	1,561,849	1,561,849	1,561,849	1,561,849	1,561,849	1,561,849	1,561,849	1,561,849	1,561,849	1,561,849
	1,070,274	1,480,110	1,889,946	1,889,946	1,889,946	1,889,946	1,889,946	1,889,946	1,889,946	1,889,946	1,889,946	1,889,946	1,889,946
	855,241	1,224,223	1,563,205	1,563,205	1,563,205	1,563,205	1,563,205	1,563,205	1,563,205	1,563,205	1,563,205	1,563,205	1,563,205
Dry bean	1,571,389	1,847,875	2,124,361	2,124,361	2,124,361	2,124,361	2,124,361	2,124,361	2,124,361	2,124,361	2,124,361	2,124,361	2,124,361
	989,214	1,163,266	1,337,318	1,337,318	1,337,318	1,337,318	1,337,318	1,337,318	1,337,318	1,337,318	1,337,318	1,337,318	1,337,318
	1,230,806	1,447,367	1,663,927	1,663,927	1,663,927	1,663,927	1,663,927	1,663,927	1,663,927	1,663,927	1,663,927	1,663,927	1,663,927
	1,279,955	1,505,164	1,730,372	1,730,372	1,730,372	1,730,372	1,730,372	1,730,372	1,730,372	1,730,372	1,730,372	1,730,372	1,730,372
	1,231,499	1,448,181	1,664,863	1,664,863	1,664,863	1,664,863	1,664,863	1,664,863	1,664,863	1,664,863	1,664,863	1,664,863	1,664,863
Sunflower	320,091	462,051	624,291	624,291	624,291	624,291	624,291	624,291	624,291	624,291	624,291	624,291	624,291
	119,955	173,155	233,955	233,955	233,955	233,955	233,955	233,955	233,955	233,955	233,955	233,955	233,955
	242,436	349,956	472,836	472,836	472,836	472,836	472,836	472,836	472,836	472,836	472,836	472,836	472,836
	243,067	350,867	474,067	474,067	474,067	474,067	474,067	474,067	474,067	474,067	474,067	474,067	474,067
Potatoes	149,350	193,040	234,160	234,160	234,160	234,160	234,160	234,160	234,160	234,160	234,160	234,160	234,160
	73,804	95,394	115,714	115,714	115,714	115,714	115,714	115,714	115,714	115,714	115,714	115,714	115,714
	223,735	289,185	350,785	350,785	350,785	350,785	350,785	350,785	350,785	350,785	350,785	350,785	350,785
	223,154	288,434	349,874	349,874	349,874	349,874	349,874	349,874	349,874	349,874	349,874	349,874	349,874
	181,313	234,353	284,273	284,273	284,273	284,273	284,273	284,273	284,273	284,273	284,273	284,273	284,273
Vegetables	167,474	234,952	304,226	304,226	304,226	304,226	304,226	304,226	304,226	304,226	304,226	304,226	304,226
	411,895	577,879	748,231	748,231	748,231	748,231	748,231	748,231	748,231	748,231	748,231	748,231	748,231
	580,877	814,957	1,055,197	1,055,197	1,055,197	1,055,197	1,055,197	1,055,197	1,055,197	1,055,197	1,055,197	1,055,197	1,055,197
	470,737	660,433	855,121	855,121	855,121	855,121	855,121	855,121	855,121	855,121	855,121	855,121	855,121
Alfalfa	561,108	696,798	712,488	712,488	712,488	712,488	712,488	712,488	712,488	712,488	712,488	712,488	712,488
	304,240	345,280	386,320	386,320	386,320	386,320	386,320	386,320	386,320	386,320	386,320	386,320	386,320
	352,945	400,555	448,165	448,165	448,165	448,165	448,165	448,165	448,165	448,165	448,165	448,165	448,165
	513,071	582,281	651,491	651,491	651,491	651,491	651,491	651,491	651,491	651,491	651,491	651,491	651,491
Fruit (Exist)	1,075,162	1,322,962	1,570,762	1,570,762	1,570,762	1,570,762	1,570,762	1,570,762	1,570,762	1,570,762	1,570,762	1,570,762	1,570,762
	- 142,200	- 112,664	- 112,664	- 112,664	- 112,664	- 112,664	- 112,664	- 112,664	- 112,664	- 112,664	- 112,664	- 112,664	- 112,664
	- 348,489	- 276,105	- 276,105	- 276,105	- 276,105	- 276,105	- 276,105	- 276,105	- 276,105	- 276,105	- 276,105	- 276,105	- 276,105
	- 385,041	- 305,065	- 305,065	- 305,065	- 305,065	- 305,065	- 305,065	- 305,065	- 305,065	- 305,065	- 305,065	- 305,065	- 305,065
	- 72,101	- 57,125	- 57,125	- 57,125	- 57,125	- 57,125	- 57,125	- 57,125	- 57,125	- 57,125	- 57,125	- 57,125	- 57,125
Grape (Exist)	895,921	1,197,921	1,499,921	1,499,921	1,499,921	1,499,921	1,499,921	1,499,921	1,499,921	1,499,921	1,499,921	1,499,921	1,499,921
	- 76,332	- 84,737	79,263	161,263	243,263	407,263	407,263	407,263	407,263	407,263	407,263	407,263	407,263
Poplar (Exist)	698,342	864,092	1,062,992	1,062,992	1,062,992	1,062,992	1,062,992	1,062,992	1,062,992	1,062,992	1,062,992	1,062,992	1,062,992
	- 56,110	- 56,110	- 56,110	- 56,110	- 56,110	- 56,110	- 56,110	- 56,110	- 56,110	- 56,110	- 56,110	- 56,110	- 56,110
	- 29,899	- 45,141	- 84,715	- 84,715	- 84,715	- 84,715	- 84,715	- 84,715	- 84,715	- 84,715	- 84,715	- 84,715	- 84,715
Wheat straw	2,234,925	2,462,040	2,295,650	1,690,150	1,690,150	1,690,150	1,690,150	1,690,150	1,690,150	1,690,150	1,690,150	1,690,150	1,690,150
Barley straw	735,240	672,800	610,400	394,000	394,000	394,000	394,000	394,000	394,000	394,000	394,000	394,000	394,000
Dry bean stalk	582,593	944,783	1,373,525	1,707,188	1,707,188	1,707,188	1,707,188	1,707,188	1,707,188	1,707,188	1,707,188	1,707,188	1,707,188
Total	17,405,884	25,791,181	33,463,856	36,133,713	38,078,065	39,709,434	41,288,059	42,850,459	45,033,299	46,566,659	47,825,059	48,555,459	48,670,659

Note: Years after completion of construction of the project

Table VI - 14  
Sheet 2

(Sheet 1 of 2)

Series of Net Return by crop \*\*\*\* Alternative 3 \*\*\*\*

Kind of Crop	Area (ha)	1st Year		2nd Year		3rd Year	
		(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)
Sugar beet	2,473	767,772	1,898,700	1,61,772	2,625,762	1,355,772	3,352,824
	386		296,360		408,844		523,328
	1,152		884,473		1,223,161		1,561,849
	1,394		1,070,274		1,480,110		1,889,946
	1,153		885,241		1,224,223		1,563,205
Dry bean	2,270	692,242	1,571,389	814,042	1,847,875	935,842	2,124,361
	1,429		989,214		1,163,266		1,337,318
	1,778		1,230,806		1,447,367		1,663,927
	1,849		1,279,955		1,505,164		1,730,372
	1,779		1,231,499		1,448,181		1,664,863
Sunflower	507	631,343	320,091	911,343	462,051	1,231,343	624,291
	190		119,955		173,155		233,955
	384		242,436		349,956		472,836
	385		243,067		350,867		474,067
	257	581,130	149,350	751,130	193,040	911,130	234,160
Potatoes	127		73,804		95,394		115,714
	385		223,735		289,185		350,785
	384		223,154		288,434		349,874
	312		181,313		234,353		284,273
	111	1,508,772	167,474	2,116,772	2,234,962	2,740,772	304,226
Vegetables	273		411,895		577,879		748,231
	385		580,877		814,957		1,055,197
	312		470,737		660,433		855,121
	841	667,192	561,108	757,192	636,798	847,192	1,712,488
	456		304,240		345,280		386,320
Alfalfa	529		352,945		400,555		448,165
	769		513,071		582,281		651,491
	413	2,603,297	1,075,162	3,203,297	1,322,962	3,803,297	1,570,762
	604	1,483,313	895,921	1,983,313	1,197,921	2,483,313	1,499,921
	442	1,579,960	698,342	1,954,960	864,092	2,404,960	1,062,992

Note: Years after completion of construction of each area



(Sheet 2 of 2)

Series of Net Return by crop \*\*\*\* Alternative 3 \*\*\*\*

- Economic Price -

Kind of Crop	1st Year, A=21,285		2nd Year, A=17,586		3rd Year, A=13,118		4th Year ~, A=9,658					
	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)				
Wheat	204,179	4,345,950	351,879	6,188,144	499,579	6,553,477	499,579	4,824,934				
Wheat straw	105,000	2,234,925	140,000	2,462,040	175,000	2,295,659	175,000	1,690,150				
Kind of Crop	1st Year, A=6,127		2nd Year, A=4,205		3rd Year, A=3,052		4th Year ~, A=1,970					
	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)				
Barley	85,987	526,842	192,387	808,987	298,787	911,898	298,787	588,610				
Barley straw	120,000	735,240	160,000	672,800	200,000	610,400	200,000	394,000				
Kind of Crop	1st Year, A=3,699		2nd Year, A=5,477		3rd Year, A=7,326		4th Year ~, A=9,105					
	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)				
Dry bean stalk	157,500	582,593	172,500	944,723	187,500	1,373,625	187,500	1,707,188				
Kind of Crop: Fruit(new)	1st Year		2nd Year~6th Year		7th Year		8th Year		9th Year		10th Year ~	
Area (ha)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)
234	- 500,703	- 142,200	- 396,703	- 112,664	1,603,297	455,336	2,203,297	625,736	3,003,297	852,936	3,803,297	1,080,136
696	- 348,489	- 276,105	- 276,105	- 115,895	1,115,895	1,533,495	2,090,295	2,647,095	2,309,535	432,475	547,675	2,924,735
769	- 385,041	- 305,065	- 305,065	- 230,875	1,232,935	1,694,335	2,309,535	2,924,735	2,309,535	432,475	547,675	2,924,735
144	- 72,101	- 57,125	- 57,125	- 230,875	230,875	317,275	317,275	317,275	317,275	317,275	317,275	317,275
Kind of Crop: Grape(new)	1st Year		2nd Year		3rd Year		4th Year		5th Year		6th Year ~	
Area (ha)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)
164	- 465,437	- 76,332	- 516,687	- 84,737	483,313	79,263	983,313	161,263	1,483,313	243,263	2,483,313	407,263
Kind of Crop: Poplar(new)	1st Year		2nd Year~5th Year		6th Year		7th Year		8th Year		9th Year	
Area (ha)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)	(TL/ha)	(1,000TL)
255	- 117,250	- 29,899	- 220,040	- 56,110	2,404,960	613,265	2,404,960	613,265	2,404,960	613,265	2,404,960	613,265
385	- 45,141	- 45,141	- 84,715	- 84,715	925,910	925,910	925,910	925,910	925,910	925,910	925,910	925,910

Table W- 15  
Sheet 1

PROFIT AND LOSS STATEMENT OF MODEL FARMER ( Model A )

ITEM	WITH PROJECT										REMARKS	
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007		
INCOM												
FARM INCOM	2,105,540	7,141,416	8,552,670	8,552,670	8,552,670	8,552,670	9,432,670	9,432,670	10,018,670	10,018,670	10,048,670	
HUSBANDRY INCOM	1,860,975	3,242,950	3,242,950	3,242,950	3,242,950	3,242,950	3,242,950	3,242,950	3,242,950	3,242,950	3,242,950	
SUB-TOTAL(A)	3,967,515	10,384,366	11,795,620	11,795,620	11,795,620	11,795,620	12,675,620	12,675,620	13,261,620	13,261,620	13,291,620	
EXPENDITURE												
PRODUCTION COST	861,614	2,540,274	2,540,274	2,540,274	2,540,274	2,540,274	2,540,274	2,540,274	2,540,274	2,540,274	2,540,274	
O/M COST	0	148,698	148,698	148,698	148,698	148,698	148,698	148,698	148,698	148,698	148,698	
INTEREST	35,209	107,585	107,585	107,585	107,585	107,585	107,585	107,585	107,585	107,585	107,585	
RAISING EXPENSES	474,932	786,550	786,550	786,550	786,550	786,550	786,550	786,550	786,550	786,550	786,550	
SUB-TOTAL(B)	1,371,755	3,583,107	3,583,107	3,583,107	3,583,107	3,583,107	3,583,107	3,583,107	3,583,107	3,583,107	3,583,107	
NET INCOME (A-B)	2,595,760	6,801,259	8,212,513	8,212,513	8,212,513	8,212,513	9,092,513	9,092,513	9,708,513	9,708,513	9,708,513	
GENERAL COST	133,658	347,552	347,552	347,552	347,552	347,552	347,552	347,552	347,552	347,552	347,552	
HOME CONSUMPTION	567,840	749,208	749,208	749,208	749,208	749,208	749,208	749,208	749,208	749,208	749,208	
LIVING EXPENSES	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	
REPAYMENT AMOUNT			(1,210,491)	(1,210,491)	(1,210,491)	(1,210,491)	(1,210,491)	(1,210,491)	(1,210,491)	(1,210,491)	(1,210,491)	
BALANCE	394,265	4,204,499	5,615,753	5,615,753	5,615,753	5,615,753	6,495,753	6,495,753	7,111,753	7,111,753	7,111,753	
PROFIT AND LOSS	2,779,045	6,983,544	12,599,296	18,215,049	23,830,802	29,446,555	35,942,308	42,438,060	49,549,813	56,661,566	56,661,566	

PROFIT AND LOSS STATEMENT OF MODEL FARMER ( Model B )

ITEM	WITH PROJECT										REMARKS	
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007		
INCOM												
FARM INCOM	3,105,180	5,614,954	6,479,130	6,479,130	6,479,130	6,479,130	6,479,130	6,479,130	6,479,130	6,479,130	6,479,130	
HUSBANDRY INCOM	1,079,100	2,426,575	2,426,575	2,426,575	2,426,575	2,426,575	2,426,575	2,426,575	2,426,575	2,426,575	2,426,575	
SUB-TOTAL(A)	4,184,280	8,041,529	8,905,705	8,905,705	8,905,705	8,905,705	8,905,705	8,905,705	8,905,705	8,905,705	8,905,705	
EXPENDITURE												
PRODUCTION COST	1,026,932	2,015,441	2,015,441	2,015,441	2,015,441	2,015,441	2,015,441	2,015,441	2,015,441	2,015,441	2,015,441	
O/M COST	0	140,544	140,544	140,544	140,544	140,544	140,544	140,544	140,544	140,544	140,544	
INTEREST	23,080	95,282	95,282	95,282	95,282	95,282	95,282	95,282	95,282	95,282	95,282	
RAISING EXPENSES	297,549	603,683	603,683	603,683	603,683	603,683	603,683	603,683	603,683	603,683	603,683	
SUB-TOTAL(B)	1,347,561	2,854,950	2,854,950	2,854,950	2,854,950	2,854,950	2,854,950	2,854,950	2,854,950	2,854,950	2,854,950	
NET INCOME (A-B)	2,836,719	5,186,589	6,050,755	6,050,755	6,050,755	6,050,755	6,050,755	6,050,755	6,050,755	6,050,755	6,050,755	
GENERAL COST	132,448	275,967	275,967	275,967	275,967	275,967	275,967	275,967	275,967	275,967	275,967	
HOME CONSUMPTION	662,480	773,640	773,640	773,640	773,640	773,640	773,640	773,640	773,640	773,640	773,640	
LIVING EXPENSES	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	
REPAYMENT AMOUNT			(1,144,364)	(1,144,364)	(1,144,364)	(1,144,364)	(1,144,364)	(1,144,364)	(1,144,364)	(1,144,364)	(1,144,364)	
BALANCE	341,791	2,436,982	3,301,148	3,301,148	3,301,148	3,301,148	3,301,148	3,301,148	3,301,148	3,301,148	3,301,148	
PROFIT AND LOSS	1,620,816	4,057,798	7,358,947	10,660,935	13,961,243	17,262,391	20,563,539	23,864,688	27,165,836	30,466,984	30,466,984	

PROFIT AND LOSS STATEMENT OF MODEL FARMER ( Model C )

ITEM	UNIT: TL											REMARKS	
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007			
INCOM													
WITHOUT PROJECT													
FARM INCOM	3,155,580	7,813,748	9,216,364	10,636,580	10,636,580	10,636,580	11,516,580	11,780,580	12,132,580	12,484,580			
HUSBANDRY INCOM	3,140,775	7,924,950	7,924,950	7,924,950	7,924,950	7,924,950	7,924,950	7,924,950	7,924,950	7,924,950			
SUB-TOTAL(A)	6,296,355	15,738,698	17,141,314	18,561,530	18,561,530	18,561,530	19,441,530	19,705,530	20,057,530	20,409,530			
EXPENDITURE													
PRODUCTION COST	1,362,147	3,092,398	3,035,198	3,035,198	3,035,198	3,035,198	3,035,198	3,035,198	3,035,198	3,035,198			
O/M COST	0	278,949	278,949	278,949	278,949	278,949	278,949	278,949	278,949	278,949			
INTEREST	64,364	162,940	162,940	162,940	162,940	162,940	162,940	162,940	162,940	162,940			
RAISING EXPENSES	809,818	1,383,146	1,383,146	1,383,146	1,383,146	1,383,146	1,383,146	1,383,146	1,383,146	1,383,146			
SUB-TOTAL(B)	2,236,329	4,917,433	4,860,233	4,860,233	4,860,233	4,860,233	4,860,233	4,860,233	4,860,233	4,860,233			
NET INCOME (A-B)	4,060,026	10,821,265	12,281,081	13,701,297	13,701,297	13,701,297	14,581,297	14,845,297	15,197,297	15,549,297			
GENERAL COST	217,197	475,449	469,729	469,729	469,729	469,729	469,729	469,729	469,729	469,729			
HOME CONSUMPTION	473,200	544,700	544,700	544,700	544,700	544,700	544,700	544,700	544,700	544,700			
LIVING EXPENSES	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000			
REPAYMENT AMOUNT			(2,271,324)	(2,271,324)	(2,271,324)	(2,271,324)	(2,271,324)	(2,271,324)	(2,271,324)	(2,271,324)			
BALANCE	1,369,630	7,801,116	9,266,652	10,686,868	10,686,868	10,686,868	11,566,868	11,830,868	12,182,868	12,534,868			
PROFIT AND LOSS	7,801,116	17,067,767	27,754,635	38,441,503	49,128,371	59,815,238	71,382,106	83,212,974	95,395,641	107,930,709			

Table W-16

Financial Cash Flow Statement

Year in Order	Foreign Portion <F.C>				Local Portion <L.C>				TOTAL
	Loan Disbursement	Accumulated Loan	Repay'm't of Loan Interest	Repay'm't of Loan Capital	Loan Disbursement	Accumulated Loan	Repay'm't of Loan Interest	Repay'm't of Loan Capital	
1990	360.4	360.4	--	--	3,243.4	3,243.4	--	--	0.0
1991	360.4	731.6	--	--	3,243.4	6,584.0	--	--	0.0
1992	6,576.1	7,329.6	--	--	12,316.7	19,098.2	--	--	0.0
1993	10,345.5	17,894.9	--	--	22,180.6	41,851.8	--	--	0.0
1994	9,046.5	27,478.2	--	--	19,376.7	62,484.1	--	--	0.0
1995	10,267.6	38,570.2	--	--	23,568.8	87,927.4	--	--	0.0
1996	10,607.6	50,334.9	--	--	21,783.2	112,348.5	--	--	0.0
1997	9,729.9	61,574.8	--	--	24,208.9	139,927.9	--	--	0.0
1998	--	63,422.0	--	--	--	144,125.7	--	--	0.0
1999	--	65,324.7	--	--	--	148,449.5	--	--	0.0
2000	62,893.6	1,959.7	1,959.7	2,431.1	--	146,480.7	4,453.5	1,968.8	10,813.1
2001	60,388.6	1,866.8	1,866.8	2,504.0	--	144,432.8	4,394.4	2,027.9	10,813.1
2002	57,810.4	1,811.7	1,811.7	2,579.2	--	142,364.1	4,333.6	2,088.7	10,813.1
2003	55,153.9	1,734.3	1,734.3	2,656.5	--	140,212.8	4,270.9	2,151.4	10,813.1
2004	52,417.6	1,654.6	1,654.6	2,736.2	--	137,936.9	4,206.4	2,215.9	10,813.1
2005	49,599.3	1,572.5	1,572.5	2,818.3	--	135,714.5	4,139.9	2,282.4	10,813.1
2006	46,696.5	1,488.0	1,488.0	2,902.9	--	133,363.7	4,071.4	2,350.8	10,813.1
2007	43,706.5	1,400.9	1,400.9	2,990.0	--	130,942.3	4,000.9	2,421.4	10,813.1
2008	40,626.9	1,311.2	1,311.2	3,079.7	--	128,448.3	3,928.3	2,494.0	10,813.1
2009	37,454.8	1,218.8	1,218.8	3,172.0	--	125,879.5	3,853.4	2,568.8	10,813.1
2010	34,187.6	1,123.6	1,123.6	3,267.2	--	123,233.6	3,776.4	2,645.9	10,813.1
2011	30,822.4	1,025.6	1,025.6	3,365.2	--	120,508.3	3,697.0	2,725.3	10,813.1
2012	27,356.2	924.7	924.7	3,466.2	--	117,701.3	3,615.2	2,807.0	10,813.1
2013	23,786.1	820.7	820.7	3,570.2	--	114,810.0	3,531.0	2,891.2	10,813.1
2014	20,108.8	713.6	713.6	3,677.3	--	111,832.1	3,444.3	2,978.0	10,813.1
2015	16,321.2	603.3	603.3	3,787.6	--	108,764.8	3,355.0	3,067.3	10,813.1
2016	12,420.0	489.6	489.6	3,901.2	--	105,505.4	3,262.9	3,159.3	10,813.1
2017	8,401.8	372.6	372.6	4,018.2	--	102,351.3	3,168.2	3,254.1	10,813.1
2018	4,263.0	252.1	252.1	4,138.8	--	98,999.6	3,070.5	3,351.7	10,813.1
2019	0.0	127.9	127.9	4,263.0	--	95,547.3	2,970.0	3,452.3	10,813.1
2020	--	--	--	--	--	91,991.4	2,866.4	3,555.9	6,422.3
2021	--	--	--	--	--	88,328.9	2,759.7	3,662.5	6,422.3
2022	--	--	--	--	--	84,556.5	2,648.9	3,772.4	6,422.3
2023	--	--	--	--	--	80,670.9	2,536.7	3,885.6	6,422.3
2024	--	--	--	--	--	76,668.7	2,420.1	4,002.2	6,422.3
2025	--	--	--	--	--	72,546.5	2,300.1	4,122.2	6,422.3
2026	--	--	--	--	--	68,300.6	2,176.4	4,245.9	6,422.3
2027	--	--	--	--	--	63,927.4	2,049.0	4,373.3	6,422.3
2028	--	--	--	--	--	59,422.9	1,917.8	4,504.5	6,422.3
2029	--	--	--	--	--	54,783.3	1,782.7	4,639.6	6,422.3
2030	--	--	--	--	--	50,008.6	1,643.5	4,778.8	6,422.3
2031	--	--	--	--	--	45,082.4	1,500.1	4,922.1	6,422.3
2032	--	--	--	--	--	40,012.6	1,352.5	5,069.8	6,422.3
2033	--	--	--	--	--	34,790.7	1,200.4	5,221.9	6,422.3
2034	--	--	--	--	--	29,412.2	1,043.7	5,378.6	6,422.3
2035	--	--	--	--	--	23,872.2	882.4	5,539.9	6,422.3
2036	--	--	--	--	--	18,166.1	716.2	5,706.1	6,422.3
2037	--	--	--	--	--	12,288.8	545.0	5,877.3	6,422.3
2038	--	--	--	--	--	6,235.2	368.7	6,053.5	6,422.3
2039	--	--	--	--	--	0.0	187.1	6,235.2	6,422.3

(Unit: 10^6 TL)

Unit Water Charge by Crop

Crops	Unit Wat Consumpt (m3/ha)	Crop Area (ha)	Water Consumption (m3/Year)	O/M Cost (TL/ha)	Repayment Cost (TL/ha)
Wheat	2,295	11,063	25,391,798	18,950	154,299
Balrey	1,831	2,257	4,132,341	15,117	123,086
Sugar beet	3,677	7,512	40,166,664	30,356	247,174
Potato	5,347	1,678	6,011,603	44,147	359,463
Dry bean	6,008	10,429	38,344,304	49,604	403,900
Sunflower	3,011	2,119	6,381,157	24,863	202,447
Alfalfa	3,110	2,973	17,861,784	25,678	209,083
Vegitable	3,583	1,238	3,850,304	29,579	240,847
Fruit	4,003	2,642	10,575,398	33,049	269,096
Vineyard	3,603	880	3,170,552	29,747	242,212
Poplar	4,003	1,239	4,959,469	33,049	269,096
<b>Total</b>		<b>44,030</b>	<b>160,845,374</b>		

1. O/M Cost

Operation and Maintenance Cost	1,126,000,000	TL/Year
Replacement Cost (5,061,000,000 /25 year)	202,000,000	TL/Year
<b>Total</b>	<b>1,328,000,000</b>	<b>TL/Year</b>

Per m3  $1,328,000,000 / 160,845,374 = 8,256$  TL/m3/Year  
 Per ha  $1,328,000,000 / 44,030 = 30,161$  TL/m3/Year

2. Repayment Cost

Per m3  $10,813,100,000 / 160,845,374 = 67,227$  TL/m3/Year  
 Per ha  $10,813,100,000 / 44,030 = 245,585$  TL/m3/Year

Table VIII- 17  
Sheet 2

(Unit:mm/year)

Water Requirement Of Each Crop

	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
Wheat	225.20	285.01	203.44	264.00	219.94	228.38	284.18	276.72	166.63	283.36	250.67	303.23	185.58	240.65	181.16
Barley	178.92	238.60	159.18	217.58	174.52	182.97	237.77	230.30	121.28	234.09	202.82	255.65	149.06	196.61	123.50
Dry Bean	360.27	407.55	339.03	387.86	370.45	373.43	388.48	396.13	329.17	377.41	406.59	414.84	322.57	348.06	336.87
Sugar Beet	529.97	592.14	512.11	564.54	543.49	535.18	556.70	570.27	473.56	555.72	594.74	604.54	479.01	507.41	479.08
Alfalfa	594.22	688.55	576.35	629.96	610.26	599.42	626.73	640.43	538.47	627.43	659.35	676.59	538.71	576.20	543.30
Sunflower	285.32	356.96	268.41	320.08	310.93	296.52	334.99	325.77	261.90	314.78	352.53	358.05	254.75	300.93	259.09
Vegetable	288.89	355.79	274.03	327.86	321.16	303.66	351.14	341.85	267.52	332.65	358.78	372.02	259.74	303.97	281.67
Potato	345.27	400.86	315.34	364.33	355.17	365.71	391.61	382.92	320.93	374.13	403.45	412.71	294.31	342.29	336.02
Fruit	385.22	458.26	367.35	425.66	414.32	390.42	441.40	455.09	332.78	449.43	446.11	475.27	343.59	372.13	333.72
Vineyard	358.45	406.85	328.78	382.79	355.49	368.81	395.94	402.60	292.99	406.07	398.58	431.96	296.02	325.73	321.31
Poplar	385.22	458.26	367.35	425.66	414.32	390.42	441.40	455.09	332.78	449.43	446.11	475.27	343.59	372.13	333.72

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
Wheat	290.82	225.18	152.40	241.93	283.47	243.68	148.24	251.01	233.54	244.92	204.12	222.67	228.90	168.95	229.82
Barley	248.63	167.17	108.10	195.20	229.97	196.72	95.97	198.62	186.50	208.86	152.75	176.74	187.37	126.81	183.49
Dry Bean	381.43	367.51	326.20	393.59	387.67	393.16	303.33	364.58	386.23	359.55	386.00	371.33	360.35	329.31	333.64
Sugar Beet	534.38	546.21	491.19	574.57	559.59	564.81	431.79	528.26	553.91	545.98	539.89	542.64	524.80	479.21	458.03
Alfalfa	630.93	609.49	554.20	639.39	630.23	632.41	492.20	594.03	620.86	616.05	609.37	606.89	585.30	539.17	530.82
Sunflower	324.66	302.20	257.32	332.91	345.41	323.22	226.00	285.85	323.14	277.19	296.98	304.89	283.97	254.38	296.11
Vegetable	344.82	303.19	256.23	337.34	349.18	329.57	247.35	309.33	326.52	297.07	318.11	309.88	280.35	257.12	299.40
Potato	390.46	370.90	298.31	378.40	411.63	379.50	298.31	372.24	380.69	341.37	375.34	354.23	339.94	303.18	348.18
Fruit	452.49	396.24	345.20	440.17	429.90	421.69	292.50	383.41	412.78	417.77	397.06	399.24	375.36	341.87	361.90
Vineyard	409.06	371.38	291.67	386.20	385.50	384.76	277.75	368.32	371.41	371.94	364.09	351.92	341.83	301.04	314.00
Poplar	452.49	396.24	345.20	440.17	429.90	421.69	292.50	383.41	412.78	417.77	397.06	399.24	375.36	341.87	361.90

	1985	1986	1987	1988	Average
Wheat	290.19	192.80	274.08	77.95	229.52
Barley	244.83	147.15	223.23	44.06	183.09
Dry Bean	397.87	382.34	404.14	313.91	367.67
Sugar Beet	591.62	546.48	592.96	455.02	534.70
Alfalfa	667.01	614.44	664.89	493.44	600.80
Sunflower	336.73	286.52	350.78	229.43	301.14
Vegetable	352.46	307.25	358.49	229.85	311.01
Potato	391.23	363.07	397.97	280.94	358.26
Fruit	460.34	429.54	463.53	297.72	400.28
Vineyard	415.47	383.61	408.67	278.99	360.29
Poplar	460.34	429.54	463.53	297.72	400.28

## PAYMENT CAPACITY (MODEL A: 6.0 ha)

Items	Present	Living Level	
		50 % up	100 % up
1. Family Income with Project	13,643,620	13,643,620	13,643,620
2. Family Income without Project	3,967,515	5,951,273	7,935,030
3. Farming Expencc *1	540,758	540,758	540,758
4. Total Expencc (2+3)	4,508,273	6,492,031	8,475,788
5. Payment Capacity (1-4)	9,135,347	7,151,589	5,167,832
6. Payment Capacity *2 (5/A)	174,405	136,533	98,660

\*1 2% of Famer's Capital 450,632 TL/Da x 60 Da x 0.02 = 540,758

\*2 A: net Area A= 60 X 0.873 = 52.38 Da

## PAYMENT CAPACITY (MODEL B: 4.5 ha)

Items	Present	Living Level	
		50 % up	100 % up
1. Family Income with Project	8,905,705	8,905,705	8,905,705
2. Family Income without Project	4,184,280	6,276,420	8,368,560
3. Farming Expencc *1	405,569	405,569	405,569
4. Total Expencc (2+3)	4,589,849	6,681,989	8,774,129
5. Payment Capacity (1-4)	4,315,856	2,223,716	131,576
6. Payment Capacity *2 (5/A)	109,846	56,598	3,349

\*1 2% of Famer's Capital 450,632 TL/Da x 45 Da x 0.02 = 405,569

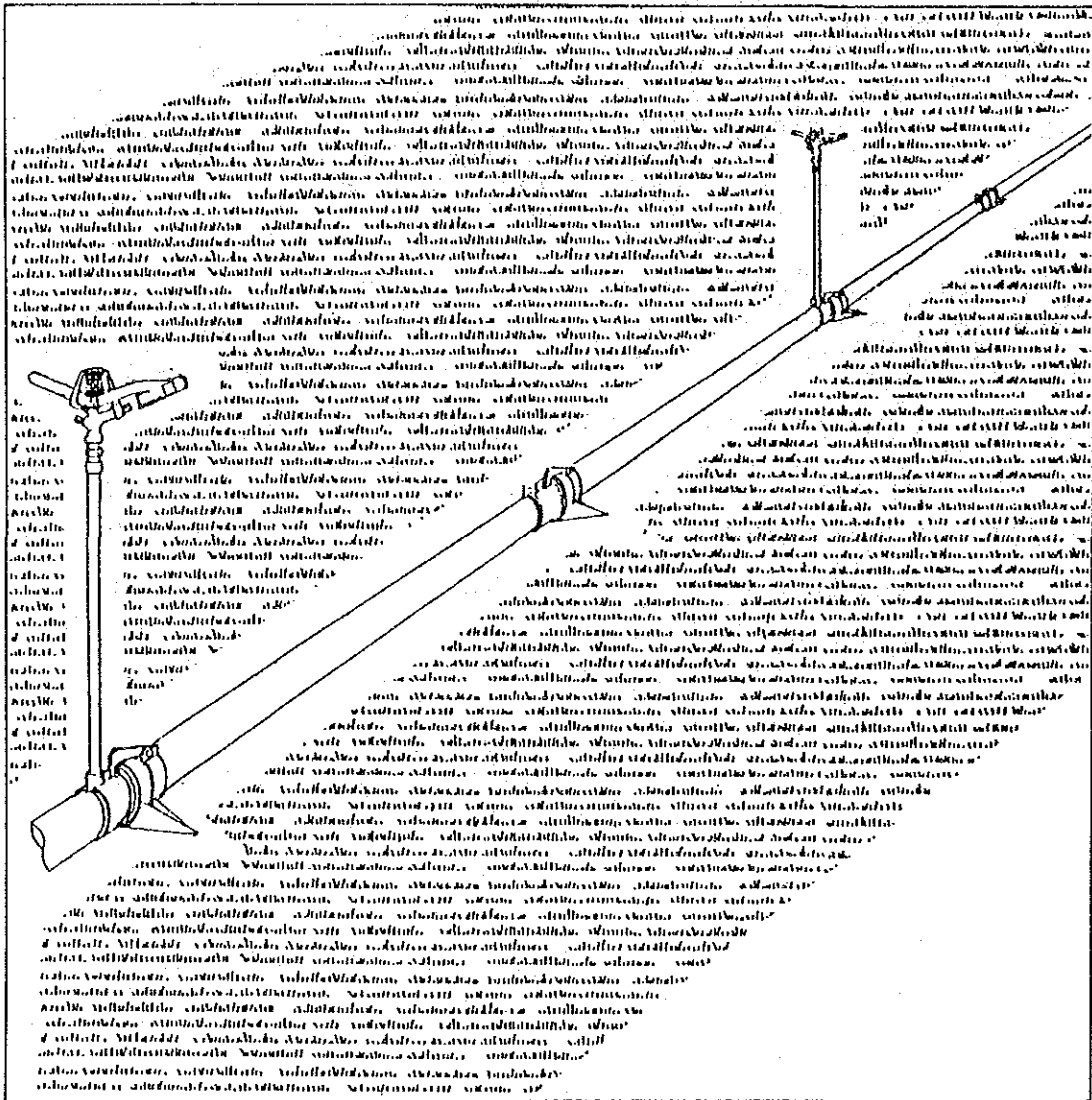
\*2 A: net Area A= 45 X 0.873 = 39.29 Da

## PAYMENT CAPACITY (MODEL C: 10.0 ha)

Items	Present	Living Level	
		50 % up	100 % up
1. Family Income with Project	20,409,530	20,409,530	20,409,530
2. Family Income without Project	6,296,355	9,444,533	12,592,710
3. Farming Expencc *1	901,264	901,264	901,264
4. Total Expencc (2+3)	7,197,619	10,845,797	13,493,974
5. Payment Capacity (1-4)	13,211,911	10,063,733	6,915,556
6. Payment Capacity *2 (5/A)	151,339	115,278	79,216

\*1 2% of Famer's Capital 450,632 TL/Da x 100 Da x 0.02 = 901,264

\*2 A: net Area A= 100 X 0.873 = 87.30 Da





**Appendix IX**

**Design of Sprinkler Irrigation  
Systems for the Selected Area**



## IX-1 Selection of Sprinkler Farm

### (1) Selection Criteria

Selection criteria were determined in consultation with DSI as follows:

- ① 40 ha blocks are to be selected at 3 locations
- ② Criteria for each block are as follows:
  - A Block: Site where sprinkler feed from the design canal water level is possible by gravity.
  - B Block: Site where sprinkler feed from the design canal is possible by pump (pump, pipe, and sprinkler are directly connected).
  - C Block: Site where sprinkler feed is possible by gravity from storage tank fed from design canal by pump.
- ③ Sites are to be selected within reasonable distance of DSI office and relatively close to one another for ease of operation and maintenance of facilities.

The area which satisfies the above criteria is limited to that from Afsin to Alitas.

### (2) Site Selection

- a. The following candidate sites were selected on the basis of the criteria in (1) above and topomapping (1/25,000 scale)

#### ① A Block

An area within the west side benefit area at Alitas was selected due to short distance between canal and target area, availability of 40-50m head, and close proximity to settlement. (vicinity of No.1+000 of Alitas No. 2 main canal)

#### ② B Block

An area in vicinity of No. 55+000 of main canal at south side of Emirilyas was selected due to absence of topographical constraints.

③ C Block

Area is to be either in vicinity of No. 56+000 ~ No. 57+000 of main canal or No. 0+000 of Alitas No. 2 main canal. This is due to requirement for gentle slope, from the standpoints of construction and O/M, for the storage tank to be constructed at elevated location.

- b. Locations of A, B and C blocks are shown in Plate IX-1.

## IX-2 Study Items for Design of Sprinkler Facilities

### (1) Foundation Features

#### ① Calculation of Water Requirement

To be calculated on the basis of the peak consumption of the design crops. The computation formula most appropriate to the Project area will be selected. In Japan, general requirements for vegetables and fruits are 4-5 mm/day and 4-6 mm/day, respectively.

#### ② Irrigation Period (peak)

It is desirable that the irrigation period be as long as possible to minimize construction cost. For the fixed type facility and the movable type facility, periods of 24 h/day and 16-20 h/day, respectively, are recommended. However, night irrigation is not planned outside of peak consumption periods in view of factors of labor and crop damage.

#### ③ Irrigation Intensity

Designed within the basic intake rate ( $I_B$ ) to prevent soil wash-off. For slope, a rule of thumb for irrigation intensity is around 1/5 of  $I_B$ . For level land, it is to be 1/3 of  $I_B$ . However, 10 mm/hr or less is economical from the standpoint of construction cost of facilities.

Allowable irrigation intensity is generally as follows for the soil types below:

Sandy soil:	30 mm/hr (flat)	20 mm/hr (slope)
Normal soil:	15 mm/hr (flat)	10 mm/hr (slope)

Clayey soil: 10 mm/hr (flat) 7 mm/hr (slope)

④ Irrigation Efficiency

Irrigation efficiency is the combination of conveyance efficiency and application efficiency. Conveyance efficiency is 95% in the case of pipe, and 85% in the case of lined canal. Application efficiency depends on the field slope:

Steep slope (over 15°): 80%

Gentle slope (3~15°): 85%

Level land (less than 3°): 90%

⑤ One-time Irrigation Requirement

To adopt the highest value among the crop-wise values computed according to the TRAM method as the design value. However, it is recommended in the case of vegetables to reduce the one-time irrigation requirement, and instead increase the number of applications.

⑥ Irrigation Interval

Determined according to TRAM/peak consumption. Irrigation interval is to be uniform for all crops. Number of days is also to be uniform throughout the year. Generally, 5~8 days is common; however, there are cases of 2~3 days for sandy soil.

⑦ Number of Movements, and Time Required

Number of movements at peak consumption is [(one-time irrigation requirement) / (irrigation intensity)]. Movement time is at least 15 minutes for the fixed type and at least 30 min for the transportable type. Number of movements per day is generally 3~5.

(2) Selection of Sprinkler Type

① Type of Sprinkler Application

Sprinkler application can be either overtop of the plant or at the base of the plant. Method will be determined according to whether the former poses the danger of pest occurrence for the particular crop. Application at the base of the plant is generally adopted in the case of fruits such as grape, peach, pear, etc. In the case of apple, citrus, tea, vegetables, etc., application is generally overtop the plant.

## ② Type of Sprinkler Equipment

Sprinkler head pressure is to be calculated on the basis of type of crop and available head. Nozzle size must be determined with consideration to the size of droplets, so as not to damage the plant. This is particularly true in the case of vegetables. In general, medium pressure (2.0~3.0 kg/cm<sup>2</sup>) is applied on level land and high pressure (3.0~4.5 kg/cm<sup>2</sup>) on slopes. High pressure sprinkling is more effective where wind is strong (average wind velocity over 2m/s)

## ③ Sprinkler Deployment

Deployment of sprinkler equipment will be such that irrigation intensity and application efficiency adhere to the criteria set out in (1) - ③ and (1) - ④, respectively. Uniformity coefficient for sprinkler amount is general over 0.80 if deployment interval is within 60% of the sprinkle diameter. When applying agro-chemicals, deployment interval should be within 50% of the sprinkle diameter.

## ④ Riser Pipe

Riser pipe height is 1m in the case of typical vegetables. In the case of fruit trees, height is the average tree height.

## ⑤ Lateral Pipe (see table)

Transportable type: Ø50 mm aluminum pipe is standard.

Surface fixed type: Flexible polyethylene pipe is used. Pipe diameter is determined for each interval on the basis of hydraulic computations.

Diameter for each interval is determined such that sprinkler pressure differential for any one lateral pipe is within 20%.

## ⑥ Supply Valve Pressure

Necessary pressure is equal to: [required sprinkler pressure] + [riser pipe height] + [head loss along lateral pipe] + [head loss at supply valve].

## (3) Pipe

### ① Distribution Method

To be determined on the basis of comparative study of open, semi-closed, and closed types. However, the latter two types are generally used. In the case of the closed type, range is around 50~300 ha (with the

exception of large trunk lines), and a farm pond is necessary at the upstream extremity (except in the case of 24 hour irrigation).

#### ② Supply System, Network Capacity

On the basis of the above study, pressure distribution will be performed and the supply system determined.

Network capacity will be the sum of sprinkler discharge amounts in the case of small areas, and equal to the theoretical capacity in the case of large areas. The theoretical capacity is computed according to the following formula:

$$Q = 2.78 \times D \times A/H/E$$

where:

Q: theoretical capacity (l/s)

D: net water requirement (mm)

A: irrigated area (ha)

H: irrigation hours per day (hr)

E: irrigation efficiency

#### ③ Hydraulic Study

The Hazen-Williams formula will be applied to hydraulic calculations. In the case of pressure conveyance by pump, pipe diameter is determined according to the following ranges of pipe flow speed.

Ø 75~150 mm: V = 0.7~1.0 m/s

Ø 200~400 mm: V = 0.9~1.6 m/s

Ø 450~800 mm: V = 1.2~1.8 m/s

Ø 900~1500 mm: V = 1.3~2.0 m/s

Ø 1500~3000 mm: V = 1.4~2.5 m/s

#### ④ Appurtenant facilities

Farm pond and pump station will be designed. Appropriate crops and farm management form on sprinkler-type-wise and installation-method-wise bases are indicated in Table IX-1.

### IX-3 Terminal Irrigation Facilities for Sprinkler

Terminal irrigation facilities for typical vegetables and fruits will be studied.

#### (1) Design Criteria

##### ① Peak Consumption

Vegetables: 5.0 mm/day

Fruits: 6.0 mm/day

##### ② Irrigation Hours (peak)

In principle, the transportable type or surface fixed type is to be used for vegetables, and the buried fixed type for fruits. Irrigation hours per day are to be 16 h for the transportable type and 24 h for the surface fixed type and the buried fixed type.

##### ③ Irrigation Intensity

In principle, under 10 mm/hr

##### ④ Irrigation Efficiency

Conveyance efficiency: 85%

Application efficiency: 90%

##### ⑤ One-time Irrigation Requirement

Maximum field capacity is to be 25 mm.

##### ⑥ Movement Time

30 min for transportable type, and 15 min for fixed type.

##### ⑦ One-time Irrigated Area

Vegetable: 0.35 ha (100 m × 35 m)

Fruit: 0.45 ha (100 m × 45 m)

#### (2) Vegetable

##### ① Irrigation Features



Peak consumption: 5.0 mm/day

Conveyance efficiency: 85%

Application efficiency: 90%

Maximum field capacity: 25 mm

② Irrigation Interval

5 days (25 mm/ 5.0 mm/ day)

③ One-time Net Irrigation Requirement

25 mm (5.0 mm/day × 5 days)

④ Field Irrigation Requirement

27.8 mm (25 mm/ 0.90)

⑤ Sprinkler Features

Type: PILSA Type-1a (twin hole)

Nozzle dia.: 4.5 mm × 4.8 mm

Pressure: 3.0 kg/cm<sup>2</sup>

Discharge: 47.3 l/min (2.84 m<sup>3</sup>/hr)

Sprinkler dia.: 31.0 m

Sprinkler placement: 18 m × 18 m (324m<sup>2</sup>)

Sprinkler intensity: 8.76 mm/hr  
(47.31/min × 6min/ 1000/ 324 m<sup>2</sup> × 1000)

No. of sprinklers: 12 locations (6 locations, 2 lines)

⑥ One-time irrigating hours

3.17 hr (27.8 mm/ 8.76 mm/ hr)

(in the case of transportable type)

⑦ Number of movements per day

Number of movements per day is put at 4 in view of the irrigation hours per day of 16. Time required for 1 movement is 30 min. (3.17 hr + 0.5 hr. = 3.67 hr; 3.67 hr × 4 times = 14.68 hr)

⑥ Irrigation hours and operation hours per day

12.68 hr (3.17 hr × 4 times); 14.68 hr (3.67 × 4 times)

⑨ Sprinkler area per one time and per day

0.35 ha; 1.4 ha (0.35 ha × 4 times)

⑩ One rotation block area

7.0 ha (5 days × 1.4 ha)

11 Network capacity

$47.3 \text{ l/min} \times 12 \text{ locations} / 60 / 0.85 = 11.13 \text{ l/s}$

(in the case of surface fixed type)

⑦ Number of movements per day

Number of movements per day is put at 7 in view of the irrigation hours per day of 24. Time required for 1 movement is 15 min. (3.17 hr + 0.25 hr. = 3.42 hr; 3.42 hr × 7 times = 23.94 hr)

⑥ Irrigation hours and operation hours per day

22.19 hr (3.17 hr × 7 times); 23.94 hr (3.42 × 7 times)

⑨ Sprinkler area per one time and per day

0.35 ha; 2.45 ha (0.35 ha × 7 times)

⑩ One rotation block area

12.25 ha (5 days × 2.45 ha)

11 Network capacity

$47.3 \text{ l/min} \times 12 \text{ locations} / 60 / 0.85 = 11.13 \text{ l/s}$

(3) Fruit

① Irrigation Features

Peak consumption: 6.0 mm/day

Conveyance efficiency: 85%  
Application efficiency: 90%  
Maximum field capacity: 25 mm

② Irrigation Interval

4 days (25 mm/ 6.0 mm/ day)

③ One-time Net Irrigation Requirement

24 mm (6.0 mm/day × 4 days)

④ Field Irrigation Requirement

26.7 mm (24 mm/ 0.90)

⑤ Sprinkler Features

Type: PILSA Type-1a  
Nozzle dia.: 5.0 mm × 7.5 mm  
Pressure: 3.0 kg/cm<sup>2</sup>  
Discharge: 89.0 l/min  
Sprinkler dia.: 38.0 m  
Sprinkler placement: 24 m × 24 m (576 m<sup>2</sup>)  
Sprinkler intensity: 9.27 mm/hr  
(89.01/min × 60 min/ 1000/ 576 m<sup>2</sup> × 1000)  
No. of sprinklers: 8 locations (4 locations, 2 lines)

⑥ One-time irrigating hours

2.88 hr (26.7 mm/ 9.27 mm/ hr)

⑦ Number of movements per day

Number of movements per day is put at 7 in view of the irrigation hours per day of 24. Time required for 1 movement is 15 min. (2.88 hr + 0.25 hr. = 3.13 hr; 3.13 hr × 7 times = 21.91 hr)

⑧ Irrigation hours and operation hours per day

20.16 hr (2.88 hr × 7 times); 21.91 hr (3.13 × 7 times)

⑨ Sprinkler area per one time and per day

0.45 ha; 3.15 ha (0.45 ha × 7 times)

⑩ One rotation block area

12.6 ha (4 days × 3.15 ha)

11 Network capacity

$89.0 \text{ l/min} \times 8 \text{ locations} / 60 / 0.85 = 13.96 \text{ l/s}$

Diagrams of sprinkler deployment for vegetables and fruits as discussed above are shown in Plate IX-2.

#### IX-4 Design of Sprinkler Facilities

Sprinkler facilities will be designed on the basis of the foregoing irrigation plan. Although both the transportable type and surface fixed type of sprinkler irrigation were discussed in the previous sections, type of irrigation is to be limited to the surface fixed type in the case of vegetables for the following reasons.

For the 3 cases of existing sprinkler irrigation in the vicinity of the Project area, all employed the surface fixed type of sprinkler irrigation. On the basis of soil conditions in the Project area, dismantling and transport of the sprinkler equipment as required for the transportable type would be extremely difficult. This type is accordingly not deemed appropriate for Project area conditions.

Facility design is carried out in the following sequence: on-farm pipe study (hydraulic computations); feed pipe (from water source to supply valve) study; pump study.

(1) Hydraulic Computation Criteria (pipe)

(a) Discharge and Pipe Diameter

A pipe diameter will be adopted which allow for flow velocity inside the pipe to be within the following ranges:

Ø 75 ~ 150: 0.7 ~ 1.0 m/s

Ø 200 ~ 400: 0.9 ~ 1.6 m/s

Discharge ~ pipe diameter relationship based on the above is as follows:

Ø 75: 0.0031 ~ 0.0044 m<sup>3</sup>/s

Ø 100: 0.0055 ~ 0.0079 m<sup>3</sup>/s

Ø 125: 0.0086 ~ 0.0123 m<sup>3</sup>/s

Ø 150: 0.0124 ~ 0.0177 m<sup>3</sup>/s

Ø 200: 0.028 ~ 0.050 m<sup>3</sup>/s

Ø 250: 0.044 ~ 0.079 m<sup>3</sup>/s

(b) Discharge Formula

Hazen-Williams formula is to be adopted.

$$\text{head loss } H = hf \times L = 10.666 \times C^{-1.85} \times D^{-4.87} \times Q^{1.85} \times L$$

where:

C: flow velocity coefficient

D: pipe diameter (m)

Q: discharge (m<sup>3</sup>/s)

L: pipe length (m)

Application of flow velocity coefficient C is as follows:

VP and FRPM: C = 150 (over Ø 200 mm); adopted value:  
C'=140

VP and FRPM: C = 140 (over Ø 150 mm); adopted value:  
C'=130

SP:                    C = 130;                    adopted value: C'=130

(C' is the adopted value subtracting 10 to take into consideration other losses besides friction.)

(2) On Farm Pipe

Site names in the hydraulic computation sheet are as shown in the sprinkler layout diagram.

When performing hydraulic computations, in addition to the foregoing section, pipe diameter is determined so as the pressure difference between the most upstream sprinkler (site c) and the most downstream sprinkler (site h) is less than 10% of the operating pressure (30m).

(3) Feed Pipe

Site names in the hydraulic computation sheet are as shown in the farm layout diagram.

Since a detailed topomap of the irrigation area was not available, the aforementioned farm layout diagram was prepared and the feed pipe study is undertaken.

Hydraulic computation procedure is as follows:

- ① The point with the most disadvantageous hydraulic conditions is postulated (since the entire field is assumed to be of the same elevation, this is the point farthest from the water source).
- ② Water pressure necessary at the supply outlet to the field to irrigate the above point is determined, and on this basis the diameter of pipe from the water source to the field is selected and the water level elevation for each point calculated.
- ③ Starting from the point where the water level elevation has been calculated, diameter for pipe leading to points for which water level elevation has not been calculated is postulated, and water level elevation calculated for these subsequent points. Pipe diameter is then corrected on the basis of the differential between the postulated value and the necessary pressure at the supply outlet to the field.

(4) Pump

Study is carried out for B and C blocks.

(a) B-Block

① Distribution Method

By pump (water source is main canal)

② Pump Station

Total head and type:

$H_1$  (required outlet level): GL+44.69 m  
(GL+41.84 m for vegetables and GL+44.69 m for fruits)

$H_2$  (minimum intake level): GL-1.00 m

$H_3$  (pump spin loss): 2.00m

$$\text{Total head } H = H_1 - H_2 + H_3 = 44.69 - (-1.00) + 2.00 \\ = 47.69 \approx 48.0\text{m}$$

Pump type is to be horizontal centrifugal.

Diameter and Nos.

$$Q = 0.0330 \text{ m}^3/\text{s} = 1.980 \text{ m}^3/\text{min}$$

A combination of  $\emptyset 100 \times 2$  units is to be adopted taking into consideration of economy and dispersion of risk.

Prime Mover Type and Output

An electric motor is to be adopted as the prime mover. Output is calculated as follows: (according to standards for pump station design)

$$P = \frac{K \times Q \times H}{E} \times (1 + R)$$

Where:

P: prime mover output (kW or ps)

K: 0.163 for kW; 0.222 for ps

Q: discharge ( $\text{m}^3/\text{min}$ )

H: total head (m)

R: reserve coefficient for prime mover:  
electric motor: 0.10 ~ 0.15  
engine: 0.15 ~ 0.20

E: pump efficiency:  
E = 0.60 for  $\phi$  100

$$P = \frac{0.163 \times 0.990 \times 48.0}{0.60} \times (1 + 0.10) = 14.20 \approx 15 \text{ kW}$$

(b) C Block

① Distribution Method

By natural gravity flow from storage tank.

Low water level (LWL): 44.61 m

High water level (HWL): 46.11 m (effective depth:  
1.50 m)

② Pump Station

Total head and type:

$H_1$  (required outlet level): GL+51.12 m  
(GL+47.69 m for vegetables and GL+51.12 m for  
fruits)

$H_2$  (minimum intake level): GL-1.00 m

$H_3$  (pump spin loss): 2.00m

$$\text{Total head } H = H_1 - H_2 + H_3 = 51.12 - (-1.00) + 2.00 \\ = 54.12 \approx 55.0 \text{ m}$$

Pump type is to be horizontal centrifugal.

Diameter and Nos.

$$Q = 0.0330 \text{ m}^3/\text{s} = 1.980 \text{ m}^3/\text{min}$$



A combination of  $\emptyset 100 \times 2$  units is to be adopted taking into consideration of economy and dispersion of risk.

#### Prime Mover Type and Output

An electric motor is to be adopted as the prime mover.

$$P = \frac{0.163 \times 0.990 \times 55.0}{0.60} \times (1 + 0.10) = 16.27 \approx 18 \text{ kW}$$

#### ③ Storage Tank

Effective capacity of the storage tank is computed as follows:

$$V = \frac{Q \times T}{4}$$

Where:

V: required effective tank capacity ( $\text{m}^3$ )

Q: pump discharge ( $\text{m}^3/\text{min}$ )

T: pump on-off cycle time (min)  
(T = 15 min on the basis of electric motor capacity)

$$P = \frac{0.990 \times 15}{4} = 3.71 \approx 4.0 \text{ m}^3$$

Since effective depth is 1.5 m as described above:

$$1.8 \text{ m (length)} \times 1.5 \text{ m (width)} \times 1.5 \text{ m (depth)} = 4.05 \text{ m}^3$$

Hydraulic computations for on-farm pipe and feed pipe according to the above criteria are shown in Table IX-2. Field layouts based on hydraulic computations are indicated in Plate IX-3.

Design features for each block are given below:

A Block

① Area and Target Crops

Area: 40 ha  
Irrigated area: 36 ha ( $40 \times 0.9 = 36$ )  
Crops: vegetables and fruits

② Distribution Method

By natural gravity flow from Aritas No. 2 main canal. On the basis of hydraulic study, required elevation for main canal in the case of vegetables is GL+44m, and GL+46m in the case of fruits.

③ Irrigation Features

Vegetables

No. of rotation blocks: 3 blocks ( $3 \times 12.25$  ha = 36.75 ha)  
Unit irrigation requirement: 11.13 l/s ( $0.01113$  m<sup>3</sup>/s)  
Conveyed volume 0.033 m<sup>3</sup>/s (3 rotation blocks)  
0.022 m<sup>3</sup>/s (2 rotation blocks)  
0.011 m<sup>3</sup>/s (1 rotation blocks)

Fruits

No. of rotation blocks: 3 blocks ( $3 \times 12.60$  ha = 37.80 ha)  
Unit irrigation requirement: 13.96 l/s ( $0.01396$  m<sup>3</sup>/s)  
Conveyed volume 0.042 m<sup>3</sup>/s (3 rotation blocks)  
0.028 m<sup>3</sup>/s (2 rotation blocks)  
0.014 m<sup>3</sup>/s (1 rotation blocks)

B Block

① Area and Target Crops

Area: 40 ha  
Irrigated area: 36 ha ( $40 \times 0.9 = 36$ )

Crops: vegetables and fruits

② Distribution Method

By pump (water source is main canal)

③ Irrigation Features

Same as A block

C Block

① Area and Target Crops

Area: 40 ha

Irrigated area: 36 ha ( $40 \times 0.9 = 36$ )

Crops: vegetables and fruits

② Distribution Method

Natural gravity flow from storage tank.

Water tank level

vegetables

Low water level (LWL) 44.61 m

High water level (LWL) 46.11 m (effective depth: 1.50)

fruits

Low water level (LWL) 47.15 m

High water level (LWL) 48.65 m (effective depth: 1.50)

③ Irrigation Features

Same as A block

## IX-5 Construction Cost Estimate

Preliminary construction costs (direct construction costs) were calculated for each case, and are indicated in Table IX-3. There is some difference in the totals for each case, despite uniform irrigated area, due to different conveyance methods and block configuration. In the case of both vegetables and fruits, construction cost for A block which is irrigated by natural gravity flow is cheaper, while that for C block is naturally higher due to the need for the storage tank.

INSTALLATION-WISE FARM MANAGEMENT

Installation method	Low pressure sprinkler	Medium pressure sprinkler	High pressure sprinkler	Remarks
Hand movable	① Vegetables (perforated pipe)	① Typical fields, vegetable fields	① Typical field, orchard, pasture	① Equipment per 10 ha is inexpensive; however, labor is required to move.
		② At least 10~20ha area of concentrated cropping	② At least 50ha area of concentrated cropping ③ Manure application	
Embedded	① Intensive cultivation of high grade vegetables	① Orchard	① Application of fertilizer	① Most energy saving.
		② Application of herbicides, fertilizer		② Equipment cost is high; however, does not interfere with farm management. No pipe breaking due to freezing.
Fixed on surface	① Rotation cropping of high grade vegetables	① 10~20ha area of concentrated cropping requiring frequent irrigation within an area of rotational cropping	① At least 1ha area of concentrated cropping requiring frequent irrigation	① Large energy saving in relation to equipment cost.
	② Orchard on slope (perforated pipe)	② Fields where large machinery is used	② Application of fertilizer	② Pipe breaking due to freezing may easily occur.
Self propelled		③ Application of herbicides, fertilizer		
		① For field preparation on relatively flat land ② Pasture	① Pasture ② For field preparation in area of high intensity cultivation	① Energy saving and economical

Table IX- 1

Table IX- 2  
Sheet 1

HYDRAULIC CALCULATION OF PIPE LINE (Inside of the Field)

[Vegetable](Sprinkler Type : PILSA Type-1a  
Operating Pressure : 3.0 kg/cm<sup>2</sup> )

Position	Length (m)	Materials Diameter (mm)	Discharge (m <sup>3</sup> /s)	Head Loss (m)	Required Water Level (m)	Remark
a	5.0	PE*1 φ 100	0.009460	0.087	GL+33.860	C*2 =130
b	9.0	" φ 75	0.004730	0.178	GL+33.773	
c	18.0	" φ 75	0.003942	0.253	GL+33.595	
d	18.0	" φ 50	0.003153	1.206	GL+33.342	
e	18.0	" φ 50	0.002365	0.708	GL+32.136	
f	18.0	" φ 50	0.001577	0.335	GL+31.428	
g	18.0	" φ 50	0.000788	0.093	GL+31.093	Required WL GL+1.0+30.0
h					GL+31.000	=GL+31.0m

Note

H = GL+33.860+2.0 = GL+35.860 ≐ GL+36.0 m  
Required pressure at position of valve : H (m)  
Head-loss of field valve : 2.0m

[Fruit] (Sprinkler Type : PILSA Type-1a  
Operating Pressure : 3.0 kg/cm<sup>2</sup> )

Position	Length (m)	Materials Bore (mm)	Discharge (m <sup>3</sup> /s)	Head Loss (m)	Required Water Level (m)	Remark
a	14.0	PE φ 100	0.011864	0.372	GL+35.238	PE:C=130
b	12.0	" φ 65	0.005932	0.721	GL+34.866	
c	24.0	" φ 65	0.004449	0.847	GL+34.145	
d	24.0	" φ 65	0.002966	0.400	GL+33.298	
e	24.0	" φ 50	0.001483	0.398	GL+32.898	Required WL GL+2.5*3+30.0
f					GL+32.500	=GL+32.5m

- \*1 Polyethylene pipe
- \*2 Coefficient of Willams-Hazen formula
- \*3 Average height of fruit tree

Note

H = GL+35.238+2.0 = GL+37.238 ≐ GL+37.5 m  
Required pressure at position of valve : H (m)  
Head-loss of field valve : 2.0m

HYDRAULIC CALCULATION OF PIPE LINE

Vegetable (Block-A)

Position	Length (m)	Materials, Diameter (mm)	Dis-charge ( m <sup>3</sup> /s)	Head Loss (m)	Velo-city (m/s)	Required WL (m)
Tank						GL+43.56
(a)	150.0	SP $\phi$ 200	0.033	1.05	1.05	GL+42.51
(b)	161.0	VP $\phi$ 200	0.033	0.85	1.05	GL+41.66
(c)	181.0	" $\phi$ 150	0.022	2.09	1.25	GL+39.57
(d)	181.0	" $\phi$ 125	0.011	1.41	0.90	GL+38.16
(a)	—	—	—	—	—	GL+42.51
(e)	367.0	VP $\phi$ 200	0.033	1.93	1.05	GL+40.58
(f)	181.0	" $\phi$ 150	0.022	2.09	1.25	GL+38.49
(g)	181.0	" $\phi$ 125	0.011	1.41	0.90	GL+37.08
(a)	—	—	—	—	—	GL+42.51
(h)	206.0	VP $\phi$ 200	0.033	1.08	1.05	GL+41.43
(i)	161.0	" $\phi$ 200	0.033	0.85	1.05	GL+40.58
(j)	181.0	" $\phi$ 150	0.022	2.09	1.25	GL+38.49
(k)	181.0	" $\phi$ 125	0.011	1.41	0.90	GL+37.08
(h)	—	—	—	—	—	GL+41.43
(l)	367.0	VP $\phi$ 200	0.033	1.93	1.05	GL+39.50
(m)	181.0	" $\phi$ 150	0.022	2.09	1.25	GL+37.41
(n)	181.0	" $\phi$ 125	0.011	1.41	0.90	GL+36.00

Note

SP : Steel pipe

VP : Vinyl pipe

Required pressure at position of each valve =GL+35.860  $\approx$  GL+36.0 m

Table IX- 2  
Sheet 3

HYDRAULIC CALCULATION OF PIPE LINE

Vegetable (Block-B)

Position	Length (m)	Materials. Diameter (mm)	Dis-charge (m <sup>3</sup> /s)	Head Loss (m)	Velo-city (m/s)	Required WL (m)
P.S.						GL+41.84
(a)	50.0	VP $\phi$ 200	0.033	0.26	1.05	GL+41.58
(b)	126.0	" $\phi$ 200	0.033	0.66	1.05	GL+40.92
(c)	111.0	" $\phi$ 125	0.022	3.12	1.79	GL+37.80
(d)	181.0	" $\phi$ 125	0.011	1.41	0.90	GL+36.39
(a)	—	—	—	—	—	GL+41.58
(e)	227.0	VP $\phi$ 200	0.033	1.19	1.05	GL+40.39
(f)	105.0	" $\phi$ 200	0.033	0.55	1.05	GL+39.84
(g)	146.0	" $\phi$ 150	0.022	1.69	1.24	GL+38.15
(h)	146.0	" $\phi$ 125	0.011	1.14	0.90	GL+37.01
(e)	—	—	—	—	—	GL+40.39
(i)	297.0	VP $\phi$ 200	0.033	1.56	1.05	GL+38.83
(j)	146.0	" $\phi$ 150	0.022	1.69	1.24	GL+37.14
(k)	146.0	" $\phi$ 125	0.011	1.14	0.90	GL+36.00
(a)	—	—	—	—	—	GL+41.58
(l)	206.0	VP $\phi$ 200	0.033	1.08	1.05	GL+40.50
(m)	91.0	" $\phi$ 200	0.033	0.48	1.05	GL+40.02
(n)	146.0	" $\phi$ 150	0.022	1.69	1.24	GL+38.33
(o)	181.0	" $\phi$ 125	0.011	1.41	0.90	GL+36.92
(l)	—	—	—	—	—	GL+40.50
(p)	56.0	VP $\phi$ 100	0.011	1.29	1.40	GL+39.21
(l)	—	—	—	—	—	GL+40.50
(q)	206.0	VP $\phi$ 200	0.033	1.08	1.05	GL+39.42
(r)	91.0	" $\phi$ 200	0.033	0.48	1.05	GL+38.94
(s)	181.0	" $\phi$ 150	0.022	2.09	1.24	GL+36.85
(t)	41.0	" $\phi$ 125	0.011	0.32	0.90	GL+36.53
(q)	—	—	—	—	—	GL+39.42
(u)	56.0	VP $\phi$ 100	0.011	1.29	1.40	GL+38.13

Note P.S. : Pump station  
VP : Vinyl pipe  
Required pressure at position of each valve =GL+35.860  $\cong$  GL+36.0 m



HYDRAULIC CALCULATION OF PIPE LINE

Vegetable (Block-C)

Posi- -tion	Length (m)	Mterials, Diameter (mm)	Dis- -charge ( m <sup>3</sup> /s)	Head Loss (m)	Velo- -city (m/s)	Required WL (m)
P.S.	300.0	VP φ 200	0.033	1.58	1.05	GL+47.69
Tank	—	—	—	—	—	GL+46.11
Tank	400.0	VP φ 200	0.033	2.10	1.05	GL+44.61
(a)	161.0	" φ 200	0.033	0.85	1.05	GL+42.51
(b)	181.0	" φ 150	0.022	2.09	1.25	GL+41.66
(c)	181.0	" φ 125	0.011	1.41	0.90	GL+39.57
(d)	—	—	—	—	—	GL+38.16
(a)	367.0	VP φ 200	0.033	1.93	1.05	GL+42.51
(e)	181.0	" φ 150	0.022	2.09	1.25	GL+40.58
(f)	181.0	" φ 125	0.011	1.41	0.90	GL+38.49
(g)	—	—	—	—	—	GL+37.08
(a)	206.0	VP φ 200	0.033	1.08	1.05	GL+42.51
(h)	161.0	" φ 200	0.033	0.85	1.05	GL+41.43
(i)	181.0	" φ 150	0.022	2.09	1.25	GL+40.58
(j)	181.0	" φ 125	0.011	1.41	0.90	GL+38.49
(k)	—	—	—	—	—	GL+37.08
(h)	367.0	VP φ 200	0.033	1.93	1.05	GL+41.43
(l)	181.0	" φ 150	0.022	2.09	1.25	GL+39.50
(m)	181.0	" φ 125	0.011	1.41	0.90	GL+37.41
(n)	—	—	—	—	—	GL+36.00

Note

P.S. : Pump station

VP : Vinyl pipe

Required pressure at position of each valve =GL+35.860 ≐ GL+36.0 m

Table IX- 2  
Sheet 5

HYDRAULIC CALCULATION OF PIPE LINE

Fruit (Block-A)

Position	Length (m)	Materials, Diameter (mm)	Dis- -charge ( $m^3/s$ )	Head Loss (m)	Velo- -city (m/s)	Required WL (m)
Tank						GL+45.50
(a)	150.0	SP $\phi$ 200	0.042	1.64	1.34	GL+43.86
(b)	161.0	VP $\phi$ 200	0.042	1.32	1.34	GL+42.54
(c)	186.0	" $\phi$ 150	0.028	3.36	1.58	GL+39.18
(d)	186.0	" $\phi$ 150	0.014	0.79	0.93	GL+38.39
(a)	—	—	—	—	—	GL+43.86
(e)	206.0	VP $\phi$ 200	0.042	1.69	1.34	GL+42.17
(f)	161.0	" $\phi$ 200	0.042	1.32	1.34	GL+40.85
(g)	186.0	" $\phi$ 200	0.028	0.72	0.89	GL+40.13
(h)	186.0	" $\phi$ 125	0.014	2.27	1.14	GL+37.86
(e)	—	—	—	—	—	GL+42.17
(i)	367.0	VP $\phi$ 200	0.042	3.02	1.34	GL+39.15
(j)	186.0	" $\phi$ 200	0.028	0.72	0.89	GL+38.43
(k)	186.0	" $\phi$ 150	0.014	0.93	0.79	GL+37.50
(a)	—	—	—	—	—	GL+43.86
(l)	206.0	VP $\phi$ 200	0.042	1.69	1.34	GL+42.17
(m)	161.0	" $\phi$ 200	0.042	1.32	1.34	GL+40.85
(n)	186.0	" $\phi$ 200	0.028	0.72	0.89	GL+40.13
(o)	186.0	" $\phi$ 125	0.014	2.27	1.14	GL+37.86

Note

SP : Steel pipe

VP : Vinyl pipe

Required pressure at position of each valve  $\cong$  GL+37.5 m

HYDRAULIC CALCULATION OF PIPE LINE  
Fruit (Block-B)

Position	Length (m)	Materials, Diameter (mm)	Dis-charge (m <sup>3</sup> /s)	Head Loss (m)	Velo-city (m/s)	Required WL (m)
P.S.						GL+44.69
(a)	50.0	VP $\phi$ 200	0.042	0.41	1.34	GL+44.28
(b)	51.0	" $\phi$ 200	0.042	0.42	1.34	GL+43.86
(c)	71.0	" $\phi$ 200	0.042	0.58	1.34	GL+43.28
(d)	141.0	" $\phi$ 150	0.028	2.55	1.58	GL+40.73
(e)	186.0	" $\phi$ 150	0.014	0.93	0.79	GL+39.80
(b)	—	—	—	—	—	GL+43.86
(f)	206.0	VP $\phi$ 200	0.042	1.69	1.34	GL+41.21
(g)	71.0	" $\phi$ 200	0.042	0.58	1.34	GL+40.63
(h)	186.0	" $\phi$ 200	0.028	0.72	0.89	GL+39.91
(i)	141.0	" $\phi$ 125	0.014	1.72	1.14	GL+38.19
(f)	—	—	—	—	—	GL+41.21
(j)	277.0	VP $\phi$ 200	0.042	2.28	1.34	GL+38.93
(k)	186.0	" $\phi$ 200	0.028	0.72	0.89	GL+38.21
(l)	141.0	" $\phi$ 150	0.014	0.71	0.79	GL+37.50
(s)	—	—	—	—	—	GL+43.86
(m)	206.0	VP $\phi$ 200	0.042	1.69	1.34	GL+42.17
(n)	71.0	" $\phi$ 125	0.014	0.86	1.14	GL+41.31
(m)	—	—	—	—	—	GL+42.17
(o)	116.0	VP $\phi$ 200	0.042	0.95	1.34	GL+41.22
(p)	96.0	" $\phi$ 150	0.028	1.74	1.58	GL+39.48
(q)	141.0	" $\phi$ 125	0.014	1.72	1.14	GL+37.76
(m)	—	—	—	—	—	GL+42.17
(r)	206.0	" $\phi$ 200	0.042	1.69	1.34	GL+40.48
(s)	116.0	" $\phi$ 125	0.014	1.41	1.14	GL+39.07
(r)	—	—	—	—	—	GL+40.48
(t)	116.0	" $\phi$ 200	0.042	0.95	1.34	GL+39.53
(u)	96.0	" $\phi$ 200	0.028	0.37	0.89	GL+39.16
(v)	96.0	" $\phi$ 125	0.014	1.17	1.14	GL+37.99

Note  
S.P.: Pump station  
VP : Vinyl pipe  
Required pressure at position of each valve  $\hat{=}$  GL+37.5 m

Table IX- 2  
Sheet 7

HYDRAULIC CALCULATION OF PIPE LINE

Fruit (Block-C)						
Posi- -tion	Length (m)	Mterials, Diameter (mm)	Dis- -charge ( m <sup>3</sup> /s)	Head Loss (m)	Velo- -city (m/s)	Required WL (m)
P.S.	300.0	VP φ 200	0.042	2.47	1.34	GL+51.12
Tank	—	—	—	—	—	GL+48.65
Tank	—	—	—	—	—	GL+47.15
(a)	400.0	VP φ 200	0.042	3.29	1.34	GL+43.86
(b)	161.0	" φ 200	0.042	1.32	1.34	GL+43.86
(c)	186.0	" φ 150	0.028	3.36	1.58	GL+42.54
(d)	186.0	" φ 150	0.014	0.93	0.79	GL+39.18
(a)	—	—	—	—	—	GL+38.25
(e)	206.0	VP φ 200	0.042	1.69	1.34	GL+43.86
(f)	161.0	" φ 200	0.042	1.32	1.34	GL+42.17
(g)	186.0	" φ 200	0.028	0.72	0.89	GL+40.85
(h)	186.0	" φ 125	0.014	2.27	1.14	GL+40.13
(e)	—	—	—	—	—	GL+37.86
(i)	367.0	VP φ 200	0.042	3.02	1.34	GL+42.17
(j)	186.0	" φ 200	0.028	0.72	0.89	GL+39.15
(k)	186.0	" φ 150	0.014	0.93	0.79	GL+38.43
(a)	—	—	—	—	—	GL+37.50
(l)	206.0	VP φ 200	0.042	1.69	1.34	GL+43.86
(m)	161.0	" φ 200	0.042	1.32	1.34	GL+42.17
(n)	186.0	" φ 200	0.028	0.72	0.89	GL+40.85
(o)	186.0	" φ 125	0.014	2.27	1.14	GL+40.13
						GL+37.86

Note

S.P.: Pump station

VP : Vinyl pipe

Required pressure at position of each valve ≅ GL+37.5 m



Cost Estimation

Block-B (Vegetable)

: \$549,000.00.-

(Unit: \$ )

Description	Specification	Unit	Quantity	Unit Cost	Cost
Facilities in the Field	Field Valve ~ Sprinkler Head	Set	105	3,447.00	361,935.00
Materials for Pipe Line	φ 200 VP (Vinyl Pipe)	m	1,399	19.78	27,672.22
	φ 150 VP	"	619	13.18	8,158.42
	φ 125 VP	"	806	8.69	7,004.14
	φ 100 VP	"	77	6.74	518.98
Materials for Incidental Works	30% of Materials Cost	Set	1	—	13,006.13
Pipe Line Works	φ 200 VP	m	1,399	16.55	23,153.45
	φ 150 VP	"	619	14.42	8,925.98
	φ 125 VP	"	806	13.05	10,518.30
	φ 100 VP	"	77	11.67	898.59
Incidental Works	30% of Lying Cost	Set	1	—	13,048.90
Pump Shed	5m*4m R.C.Structure	m <sup>2</sup>	20.0	1,171.33	23,426.60
Other Structures	Suction Tank etc.	Set	1	—	3,904.42
Pump Facilities	Centrifugal Pump φ 100*2, 15kw	kw	30	1,561.77	46,853.10
Total					549,024.23
					549,000.00









Table IX- 3  
Sheet 6

Cost Estimation

Block-C (Fruit)

: \$584,300.00.-

(Unit: \$ )

Description	Specification	Unit	Quantity	Unit Cost	Cost
Facilities in the Field	Field Valve ~ Sprinkler Head	Set	84	4,163.00	349,692.00
Materials for Pipe Line	φ 200 VP (Vinyl Pipe)	m	2,520	19.78	49,845.60
	φ 150 VP	"	558	13.18	7,354.44
	φ 125 VP	"	372	8.69	3,232.68
Materials for Incidental Works	30% of Materials Cost	Set	1	—	18,129.82
Pipe Line Works	φ 200 VP	m	2,520	16.55	41,706.00
	φ 150 VP	"	558	14.42	8,046.36
	φ 125 VP	"	372	13.05	4,854.60
Incidental Works	30% of Lying Cost	Set	1	—	16,382.09
Pump Shed	5m*4m R.C. Structure	m <sup>2</sup>	20.0	1,171.33	23,426.60
Other Structures	Suction Tank etc.	Set	1	—	3,904.42
Pump Facilities	Centrifugal Pump φ 100*2,18kw	kw	36	1,561.77	56,223.72
Junction Tank (R.C. Structure)	1.8 <sup>L</sup> * 1.5 <sup>B</sup> * 1.5 <sup>H</sup>	Set	1	—	1,561.77
Total					584,360.10
					584,300.00

Cost for On-Farm Irrigation Facilities (Vegetable)

: \$ 3,447.00 --

(Unit : \$/0.35ha)

Description	Specification	Unit	Quantity	Unit Cost	Cost
Sprinkler Head	3.0kg 4.5*4.8mm	Piece	12	39.04	468.48
Riser Pipe	φ 20mm l=1.0m	"	12	25.77	309.24
T bend for Riser	φ 75*50mm M.C.I	"	4	60.83	243.32
Reducer for T bend	φ 50*20mm "	"	4	24.29	97.16
Riser Saddle	φ 50*20 by Aruminiumu	"	8	24.99	199.92
T bend	φ 100*100mm VP (HI)	"	1	22.08	22.08
Reducer	φ 100*75mm "	"	2	7.40	14.80
Elbow	φ 75mm M.C.I	"	2	74.26	148.52
Reducer	φ 75*50mm "	"	2	47.95	95.90
One-touch Socket	φ 75mm by Aruminiumu	"	4	117.13	468.52
"	φ 50mm "	"	8	52.32	418.56
Cap	φ 50mm "	"	2	17.18	34.36
Field Valve	φ 100mm Angle Valve	"	1	276.43	276.43
Pipe	φ 100mm Polyethylene	m	5.0	7.17	35.85
"	φ 75mm "	"	54.0	5.06	273.24
"	φ 50mm "	"	144.0	2.37	341.28
Total					3,447.66
					3,447.00

Note) M.C.I : Malleable Cast Iron

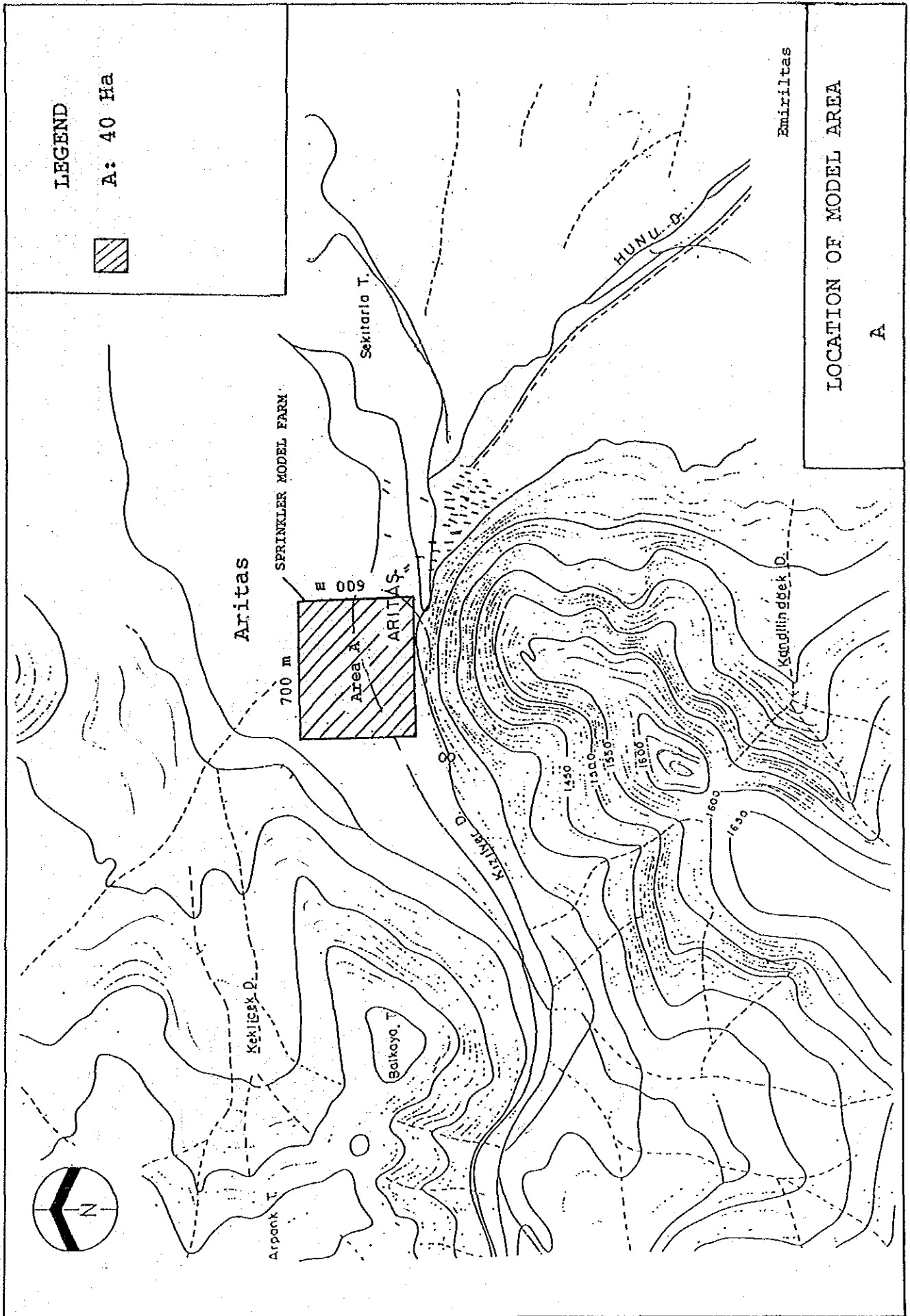
Table IX- 3  
Sheet 8

Cost for On-Farm Irrigation Facilities (Fruit)

: \$4,163.00-

(Unit : \$/0.45ha)

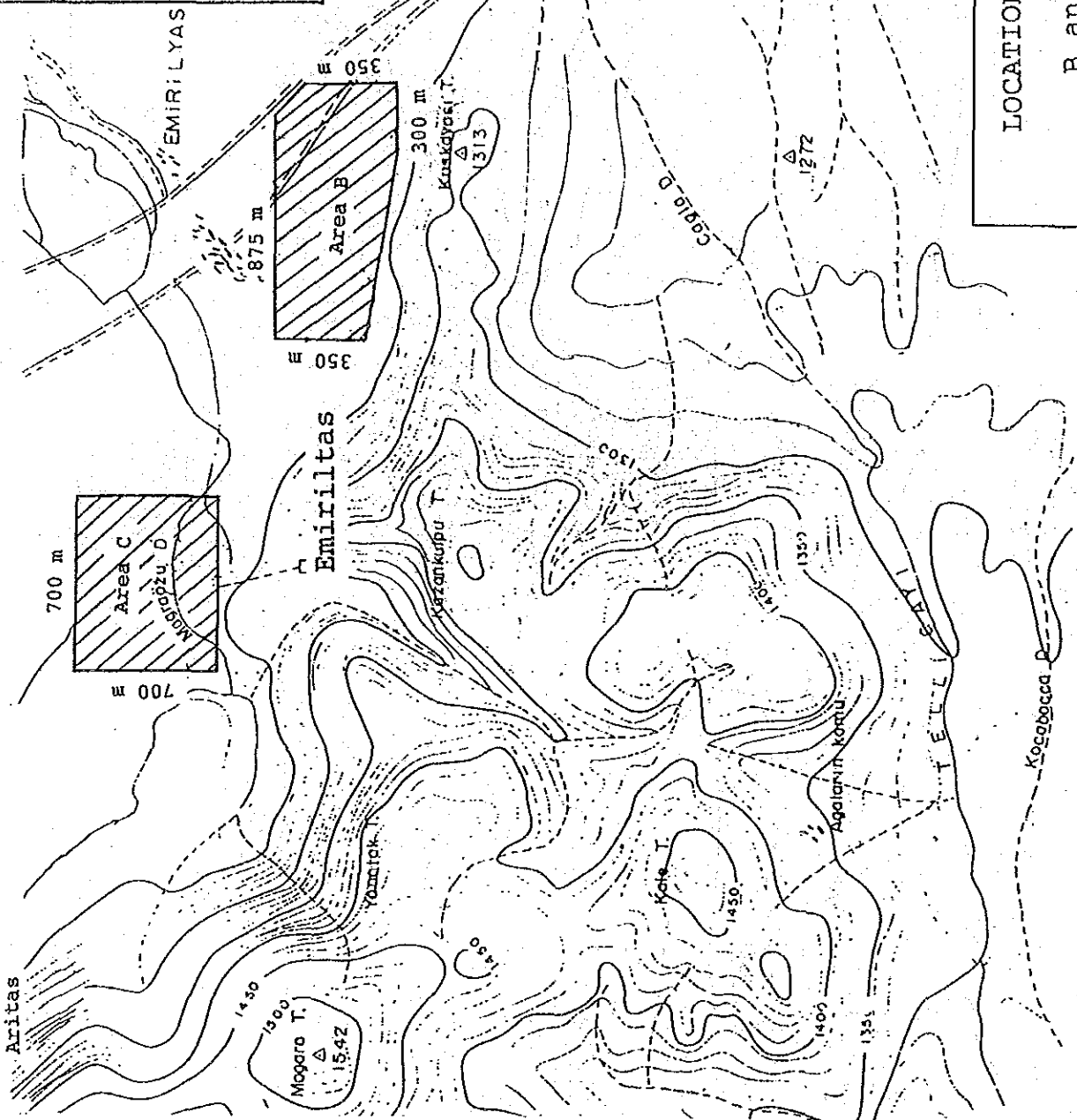
Description	Specification	Unit	Quantity	Unit Cost	Cost
Sprinkler Head	3.0kg 5.0*7.5mm	Piece	8	58.57	468.56
Riser Pipe	φ 25 l=3.0m Arumi.	"	8	73.40	587.20
Riser Stay	Twin Spike	"	8	35.14	281.12
T bend for Riser	φ 65*50 VP(HI)	"	6	5.54	33.24
Reducer for T bend	φ 50*25 "	"	6	1.64	9.84
T bend for Riser	φ 50*25 "	"	2	3.23	6.46
T bend	φ 100*100 "	"	1	22.08	22.08
Reducer	φ 100*65 "	"	2	11.45	22.90
Elbow	φ 65 "	"	2	4.01	8.02
Reducer	φ 65*50 "	"	2	3.05	6.10
Socket	φ 100 "	"	4	8.15	32.60
"	φ 65 "	"	30	2.77	83.10
"	φ 50 "	"	12	1.59	19.08
Cap	φ 50 "	"	2	1.10	2.20
Field Valve	φ 100 Angle Valve	"	1	276.43	276.43
Valve Socket	φ 100 VP(HI)	"	2	5.52	11.04
Materials for Pipe	φ 100 "	m	14.0	10.00	140.00
"	φ 65 "	"	120.0	4.40	528.00
"	φ 50 "	"	48.0	3.42	164.16
Pipe Line Works	φ 100 "	"	14.0	11.67	163.38
"	φ 65 "	"	120.0	8.27	992.40
"	φ 50 "	"	48.0	6.36	305.28
Total					4,163.19
					4,163.00



LEGEND



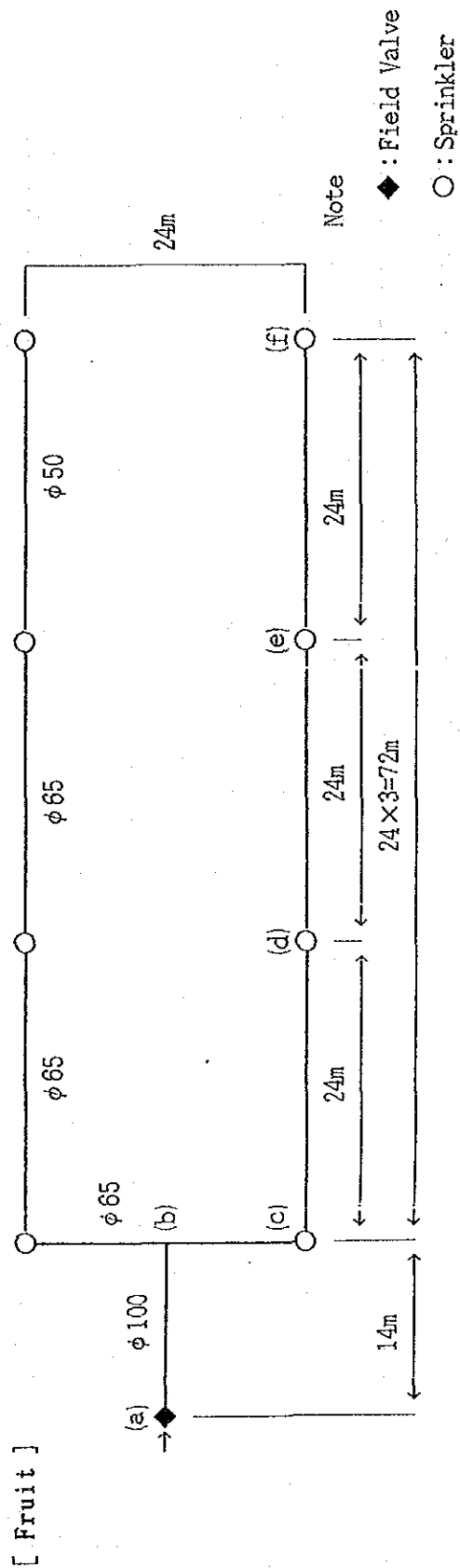
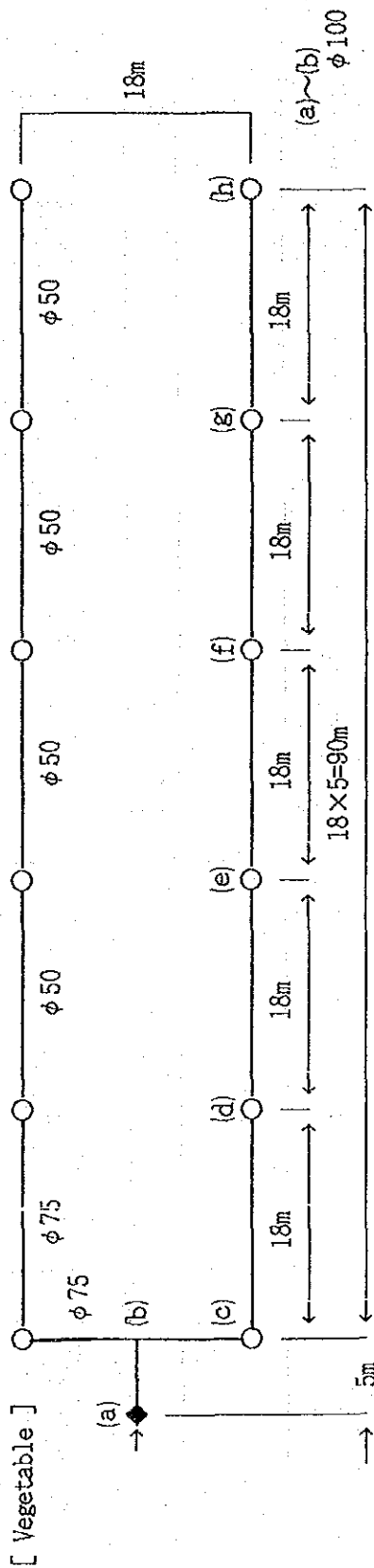
B: 40 Ha C: 40 Ha



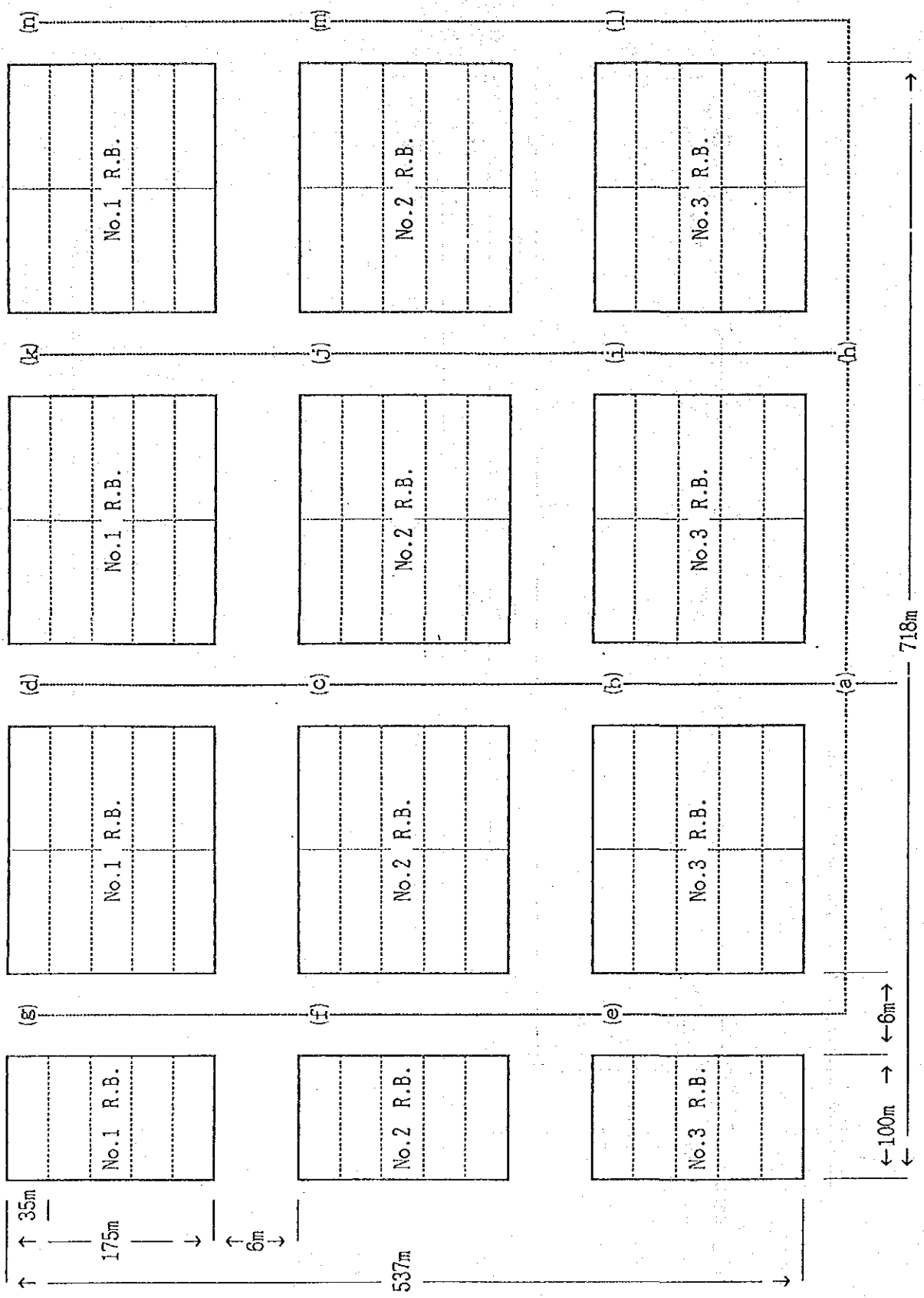
LOCATION OF MODEL AREA

B and C

LOCATION OF SPRINKLER

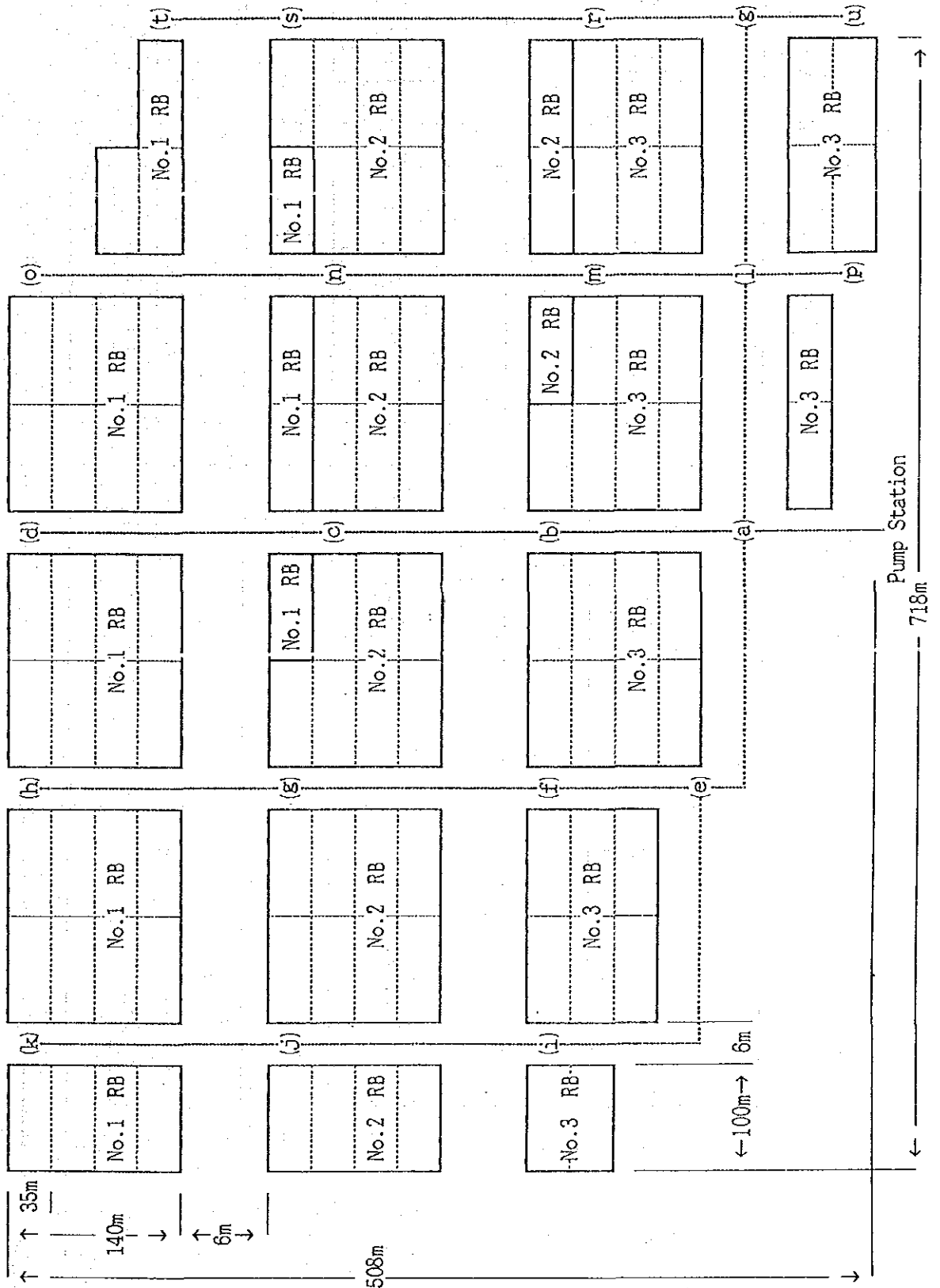


LOCATION OF FIELDS (Vegetable Block-A,C)  
(Note) R.B. : Rotation Block



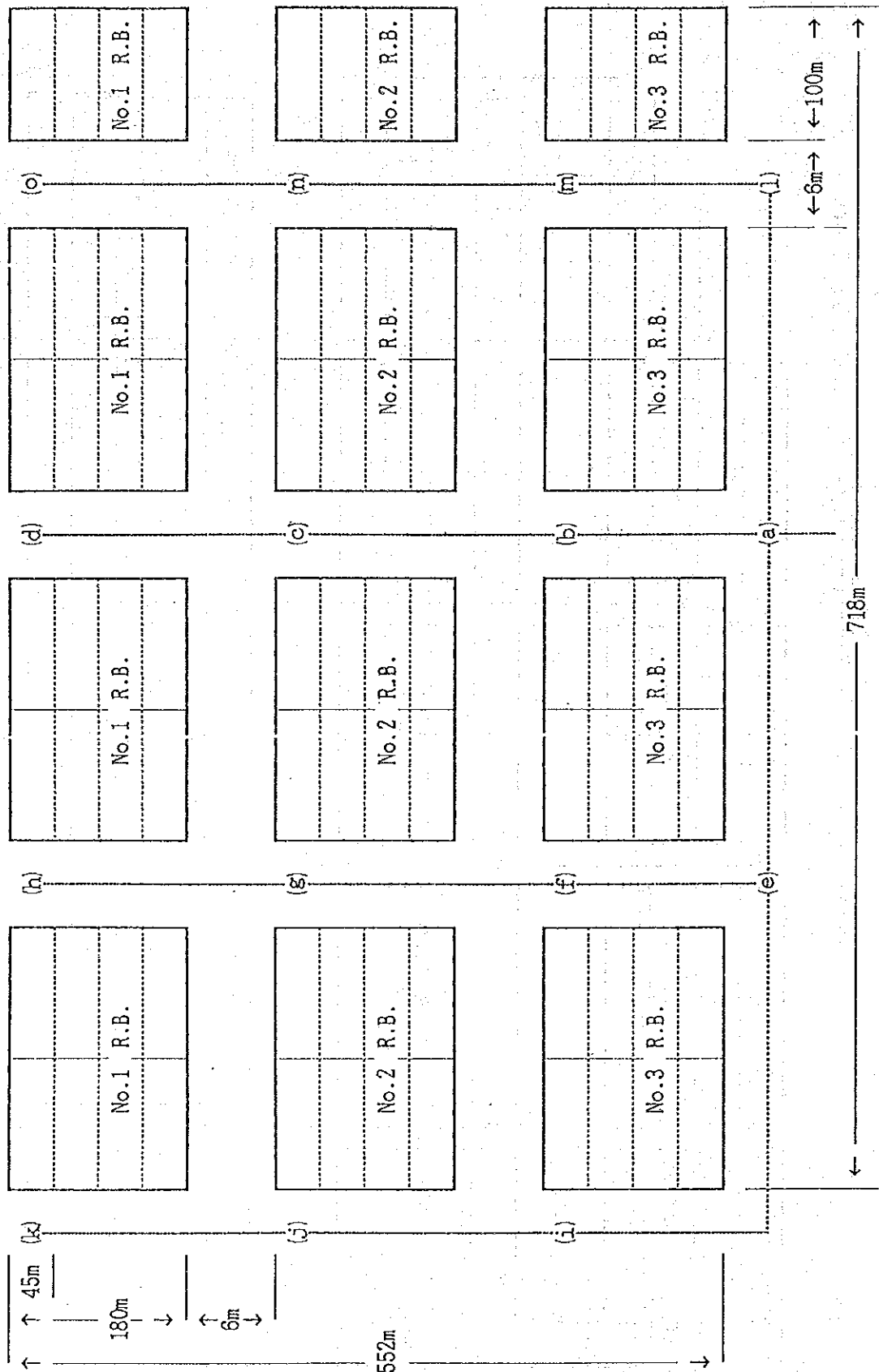


LOCATION OF FIELDS (Vegetable, Block-B)  
Note) R B : Rotation Block



LOCATION OF FIELDS (Fruit, Block-A, C)

Note) R.B. : Rotation Block



LOCATION OF FIELDS (Fruit, Block-B)  
Note) R B : Rotation Block

