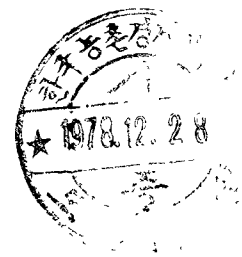
FINAL REPORT
DECEMBER 1978

EVALUATION STUDY ON UPLAND RECLAMATION PROJECT UNDER IBRD LOAN

JAE-SUN CHOI



KOREA RURAL ECONOMICS INSTITUTE

Evaluation Study on Upland Reclamation Project

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I. INTRODUCTION

Total land area of Korea is only 98,807 KM^2 while the total population reached to 37,015 thousand persons as of October 31, 1978, having an extraordinarily high density with 374.6/KM^2. The density becomes higher and higher as the time passes due to the strictly inelastic land supply with ever growing demand for land.

67 per cent of the total land area (98,807 KM^2) is occupied by mountains and hills, and 250 farm households are still on the farms. Thus the average farm size is only 0.97 hectares. On the contrary, the farm land areas that are encroached by industrialization and urbanization alone has reached to 20,000 hectares per annum. The rate of the encroachments on farm lands has exceeded the rate of farm land increased by reclamations. On top of that, the demand for open spaces including farm land areas has been tremendously increased as the recreational demand for open spaces and amenity resources increases. The increase in demand becomes accelerated as the national income increases.

In this respect the reclamation is a social desideratum from the stand point of not only the demand for urban and industrial lands but also that for farm uses and open spaces.

II. THE OBJECTIVES AND METHODOLOGY

1. Objectives of the Study

The major objective of the study is to evaluate the 1977 IBRD Saemaul Upland Reclamation Projects in terms of their sicio-economic effects, and to present the ways and directions in which the future upland reclamation projects can be effectively conducted.

In order to successfully carry out the above major objective, this study sets the following working objectives.

1) To analyze the charactersitics of farm operations and land use patterns in the reclamation areas.

2) To investigate the limitations and problems of farm operations.

3) To analyze the economic validity of the investment projects.

4) To observe the opinions of the farmers on whether or not to continue the reclamation projects.

5) To analyze the socio-economic effects of the investment projects, and

6) To present the directions and methods in which the future reclamation projects can be effectively implemented.

2. Methodology of the Study

The study employed the methods of B/C analysis on the reclamation investment projects and the financial analyses of the farms in order to successfully meet the above objectives. The research collected original data through field surveys and related secondary data.

3. Scope of the Study

The study covered 12 individual reclamation investment projects out of 147 upland reclamation projects that have been so far implemented since 1972. Four projects out of fourteen 77 IBRD projects were sampled together with eight non-IBRD projects out of 93. The number of farms covered in this research is 249 in all. (See Table 1)

Table 1. Survey Areas by Project Year and Sample Sizes, 1978

Project Year	No. of Projects			No. of Villages			No. of Farmers		
	Total Projects (A)	Surveyed Projects (B)	Ratio (B/A)	Total Villages	Surveyed Villages	Ratio	No. of Farms	Surveyed Farms	Ratio
PY 72	4	2	50.0	12	12	100.0	185	28	15.1
PY 74	2	2	100.0	86	60	69.8	1,439	78	5.4
PY 75	37	2	5.4	28	28	100.0	484	72	14.9
PY 76	50	2	4.0	10	10	100.0	150	21	14.0
PY 77	14	4	28.0	30	30	100.0	354	50	14.1
Total or Average	107	12	11.2	166	140	84.3	2,612	249	9.5

III. PRESENT SITUATIONS OF UPLAND RECLAMATION PROJECTS

1. History: 1957-1977

Upland reclamation projects were originally initiated by the government in an attempt to settle the refugees during the Korean War after 1957. In 1962, the projects were undertaken based on foreign assistance under the Law of Reclamation Promotion. During the period of 1965-1966, the projects were financed through PL 480. After having some adjustments over the period of 1967-1971, the projects have been actively undertaken by the government since 1972.

The development policies by period can be briefly summarized as follows;

Stages	Year	Major Contents
Trial and Initiation Period	1957	Initiated by government.
	7/1960	Pilot Projects were sponsored by UN Special Funds by UNKUP
	8/1961	24 projects for resettlement
Enforcement Period	2/1962	Law of Reclamation Promotion was enacted

Stages	Year	Major Contents
	1965-1966	Law of Reclamation Promotion was substituted by Law of Farm Land Construction
Adjustment Period	1967-1971	Government subsidies were replaced by PL 480 funds
Large Unit Development Period	1972-Present	Law of Farm Land Construction was replaced by Farmland Enlargement and Development Promotion in 1975. Active government subsidies started again

2. Results of the Upland Reclamation Projects

Table 2 shows the actual results of the upland reclamation projects that have been implemented under the initiation by the government, subsidizing the projects since 1972. Total number of individual projects was 147, and of which 109 projects were implemented by the Agricultural Development Corporation and 38 projects by respective Dos(provinces). The total area developed reached to 15,960 hectares and the total amount of construction costs was 8,169,273 won.

Table 2. Results of the Upland Reclamation Projects by Year (1972- 1977)

Project Year	No. of Projects			Acreage(ha)			Construction Costs(1,000 won)		
	ADC	DO	Total	ADC	DO	Total	ADC 3)	DO 4)	Total
PY 1972	4	2	6	603	399	1,002	282,819	25,599	308,418
PY 1973	2	2	4	108 1) (238)	393	501 (238)	18,684 (108,376)	33,699	52,383 (108,376)
PY 1974	2	14	16	2,793	194	3,707	1,293,669	339,354	163,302
PY 1975	37	20	57	4,667	1,493 (1,673)	6,160 (1,673)	3,028,691	372,208 (1,308,505)	3,395,899 (1,308,505)
PY 1976	50	-	50	3,082	(1,408)	3,082 (1,408)	2,741,085	38,465 (1,866,871)	2,779,550 (1,866,871)
PY 1977 2)	14	-	14	1,514	-	1,514			
	109	38	147	12,761 (238)	3,199 (3,081)	15,960 (3,319)	7,359,948 (108,376)	809,325 (3,175,376)	8,169,273 (3,283,752)

1) Figures in parentheses are not included for they are switched to other uses.
2) 14 projects in 1977 are all IBRD SAEMAUL Projects.
3) ADC represents the Agricultural Development Corporation, Korea
4) DO represents respective province.

3. The results of '77 IBRD Projects

The total number of individual projects covered by IBRD loans during 1977 was 14 as can be seen from Table 3. As can be seen from Table 3, the 77 IBRD Saemaul projects are heavily concentrated in Gyonggi DO Province and Chonbuk DO Province, having 5 and 4 projects, respectively, whereas rest of the Dos induced only two projects or none, depending upon their natural environments.

Table 3. Acreages Reclaimed and Construction Costs of '77 IBRD Saemaul Projects by Individual Projects

DO	Project name	Acreages	Subsidies	Loans	Total (1,000 won)
Gyong-gi DO	Keum-dang	316.47	146,475	103,691	250,166
	Hyang-nam	114.14	59,044	39,795	98,839
	Do-i	73.95	31,676	19,856	51,532
	Sangshin	56.71	20,646	13,237	33,883
	Dukjol *	122.79	45,193	32,205	77,398
Chungbuk-DO	Gangnae	14.21	9,795	9,322	19,117
Chungnam DO	Sunsung	195.54	107,602	94,652	202,254
	Songam *	142.84	62,571	57,104	119,675

DO	Project name	Acreages	Subsidies	Loans	Total (1,000 won)
Chonbuk DO	Oju *	93.82	41,936	31,494	73,430
	Sinwol	28.22	17,051	10,318	27,369
	Sinchon	66.74	36,839	23,431	60,270
	Galchon	47.72	24,841	14,630	39,471
Chonnam DO.	Songcheon*	201.10	70,306	58,011	128,317
	Yondong	40.14	17,259	12,552	29,811
Total	14	1,514.3	691,234	520,298	1,211,532

Source: Ministry of Agricultural and Fisheries, 1978.

* represents the 1977 surveyed projects.

The Table shows that the 14 projects covered 1514.3 hectares in all and the total costs invested reached about 1, 211, 523 thousand won.

The terms of loan by financial institutions were as follows;

1) 60 per cent of the total investment shall be subsidized by the government; 2) 40 per cent shall be borrowed from the banks at the interest rate of 10.5 per cent per annum for 5 years with 3 year grace period; and 3) the repayment shall be made from the fourth year on after the projects are implemented.

IV. FARMING SITUATIONS IN THE RECLAMATION PROJECT AREAS

There are a lot of variations in the number of natural villages per 100 hectares in the 12 reclamation project areas as can bee seen from Table 4. The number of natural villages in the surveyed area varied from 2.2 villages in 1972 to 8.1 villages in 1976. The table also shows that there is a great gap in number of the natural villages among the project areas, showing 1.9 villages in Icheon and 9.5 villages in Ochang.

Table 4. Number of Villages and Farmers per 100 Hectares of Reclaimed Areas by Project Year (PY)

Project year	Project Name	Surveyed Areas (ha)	100 ha			No. of Years of Operation
			No. of Villages Reclaimed	No. of Farms	No. of Farms Reclaimed	
PY 72	Taean	123	3.3	312.2	54.5	7
	Shinbuk	140	5.7	277.1	84.3	7
	Subtotal	263	4.6	293.5	70.3	
PY 74	Icheon	312	1.9	147.1	46.5	4
	Gochang	2,471	2.2	78.6	52.4	4
	Subtotal	2,783	2.2	86.2	51.7	

Project year	Project Name	Surveyed Areas (ha)	100 ha			No. of Years of Operation
			No. of Villages Reclaimed	No. of Farms	No. of Farms Reclaimed	
PY 75	Samsung	282	5.7	378.0	96.1	3
	Hyngyong	164	7.3	476.2	129.9	3
	Subtotal	446	6.3	414.1	108.5	
PY 76	Ochang	42	9.5	754.8	207.1	2
	Hakdong	82	7.3	353.7	76.8	2
	Subtotal	124	8.1	489.5	121.0	
PY 77	Dukjol	123	4.9	142.3	34.1	1
	Songam	143	2.8	285.3	86.7	1
	Oju	92	7.6	525.0	76.1	1
	Songcheon	201	6.5	396.0	58.7	1
	Subtotal	559	5.4	333.1	63.3	
Total		4,175	3.4	179.4	62.6	

The density of the farm households per 100 hectares of the reclaimed areas also tremendously vary from 34.1 farms in Dukjol (77 IBRD project area) to 207.1 farms in Ochang, showing 62.2 farms on the average throughout the whole surveyed areas. This situation can be interpreted as implying that these gaps could arise from the differences in natural environments of the different areas.

Table 5 shows the changes in the size of farms before and after the reclamation projects were implemented by project year. According to the Table, in 1972 reclaimed areas, the number of farms smaller than 1,500 pyongs occupied 20 per cent of the total number of farms. After the project was undertaken, the percentage was significantly reduced, that is, to 10.7 per cent. On the opposite, per cent of the farms with size greater than 1,000 pyongs was increased to 35.7 per cent from 8 per cent after the project was undertaken. Similar trends occurred in the 77 reclamation areas; that is, the composition of the farms with less than 1,500 pyongs was originally 22.2 per cent, and yet it was decreased to only 6 per cent after the project was implemented. On the average, the composition of the farms with size less than 1,500 pyongs before the project was 21.1

Table 5. Compositions of Farm Households by Size of Farms Before and After the Reclamation

Project year	Distinctions	Below 1,500 pyongs	1,501-3,000	3,001-4,500	4,501-6,000	Above 6,000 pyongs	Total
PY 72	Before	20.0	28.0	20.0	24.0	8.0	
	After	10.7	14.3	21.4	17.9	35.7	
PY 74	Before	20.3	27.5	23.2	14.5	14.5	
	After	2.6	19.2	14.1	19.2	44.9	
PY 75	Before	22.4	29.9	13.4	22.4	11.9	
	After	11.1	20.8	18.1	19.4	30.6	
PY 76	Before	19.0	23.8	19.0	23.8	14.4	
	After	4.8	19.0	-	38.1	38.1	
PY 77	Before	22.2	31.1	24.4	6.7	15.6	
	After	6.0	26.0	20.0	14.0	34.0	
Total or Average	Before	21.1	28.6	19.8	17.3	13.2	
	After	6.8	20.5	16.1	19.7	36.9	100.0

per cent and that after the project 6.8 per cent. On the contrary, before the project the percentage of the farms with size greater than 6,000 pyongs was 13.2 per cent, while it increased to 36.9 per cent after the project was undertaken.

It is very interesting to note that, on the average, smaller farms with the size of less than 1,500 pyongs become even smaller after the project, whereas the larger farms with the sizes of above 6,000 pyongs become greater after the project is implemented. This can be interpreted as implying that the average farm size in the reclamation areas has been tremendously increased due to the projects themselves and that the farms in the reclaimed areas have a trend to become larger farms.

V. COSTS AND BENEFITS OF THE RECLAMATION PROJECTS IN SURVEY AREAS.

1. Construction Costs

The upland reclamation construction costs per hectare of net upland reclaimed area were measured in an attempt to compute the costs of the investment projects and thus computing the IRRs and B/C ratios.

Table 6 shows the construction costs per hectare of net farmland developed by project year. The construction costs per hectare of net farmland developed vary with a large range from 460.7 thousand won in Taean to 1,388.4 thousand won in Ochang. However, the average construction cost per hectare for four 77 IBRD projects reached to 982.9 thousand won. It appears that such variations in the construction costs between those of the individual projects are caused not only from the differences in the engineering techniques but also from differences in costs occurred from the different scales of projects. On the contrary, it appears that the construction costs for farmland developed were estimated lower than that for net farmland developed, varying from 460.7 thousand won for Taean to 1,388.4 thousand won in Ochang, whereas the average cost was

Table 6. Construction Costs/ha of Reclaimed Farmland by Project.

Project year	Project name	Acreages		Total Cost (3)	Construction Cost/ha		Fund Sources.		
		Gross (1)	Net (2)		Gross (3)/(1)	Net (3)/(2)	Subsi-dies	Loans	Own Funds
PY 72	Taean	123	104	128,000	389.6	460.7	100	-	-
	Shinbuk	140	133	95,628	541	569.5	100	-	-
	Average	131.5			850				
PY 74 2)	Icheon	311.67	271.89	231,541	742.9	851.6	60	40	0
	Gochang	2,471	2,252	1,062,128	429.8	471.6	60	30	10
	Average	1,391.3	1,261.9		464.9	512.6			
PY 75	Samsung	282	259	181,176	642.5	699.5	60	30	10
	Hyngyong	164	150	120,935	737.4	806.2	60	30	10
	Average	223	204.5		667.4	738.7			

Project year	Project name	Acreages		Total Cost (3)	Construction Cost/ha		Fund Sources.		
		Gross(1)	Net (2)		Gross (3)/(1)	Net (3)/(2)	Subsi-dies	Loans	Own Funds
PY 76	Ochang	42.03	38.05	52,829	1,256.9	1,388.4			
	Hakdong	81.72	73.58	64,169	785.2	872.1	60	30	10
	Average	82.9	55.82		945.4	1,048.1			
PY	Dukjol	122.79	110.51	106,875	870.4	967.1	60	40	0
	Songam	142.84	130.48	150,118	1,050.9	1,150.5	60	40	0
	Oju	92.12	83.85	94,341	1,024.1	1,125.1	60	40	0
	Songchon	201.10	183.24	147,064	731.3	802.6	60	40	0
	Average	139.7	127.02		891.8	982.9			

1) Construction costs are based on the prices of respective year.
2) The terms of loans is that the interest rate is 9 per cent per annum for 5 years with 3 year grace period, but 10.5 per cent for IBRD projects

estimated 982.9 thousand won for the all four IBRD projects surveyed.

2. Productivity

Annual yields by crop per 12 areas of 72 reclaimed land areas were measured as seen in Table 7. On the average, barley production in the reclaimed areas reached to 107 Kg/10 areas in the first year of operation after the reclamation, achieving only 45.1 per cent of the average unit yield from the existing upland. In its 4th year, it achieved the highest yield showing 182 Kg/10 areas, showing only 76. 8 per cent of the average unit yield from the existing upland. These percentages, however, dropped to below 50 per cent during its 5th and 6th years due to severe drought in the early springs of the respective year. Soybean production reached the highest yield with 95 Kg/10 areas in its 5th year of operation, achieving only 93.1 per cent of the average unit yield from the existing upland. Sesame production also showed relatively low production yield only with 45 Kg/10 areas, achieving only 85 per cent of the average unit yield from the existing upland in its 4th year of farm operation, and yet from that year on the yield has been sharply

Table 7. Annual Yields by Crop from 70 ares of 72 Reclaimed Area

(Unit: Kg/10)

Year / Years of Operations / Crop	1972	1973	1974	1975	1976	1977	Average from Existing land
	1	2	3	4	5	6	
Barley	107 (45.1)	142 (59.5)	176 (74.3)	182 (76.8)	97 (40.9)	115 (48.5)	237
Soybean	55 (53.9)	59 (57.8)	64 (62.7)	69 (67.6)	95 (93.1)	69 (67.6)	101
Sweet Potato	925 (61.5)	1,118 (74.3)	1,134 (75.3)	1,422 (94.5)	1,569 (104.3)	864 (57.4)	1,418
Upland rice			126 (90.0)	151 (107.9)			140
Sesame		33 (62.3)	33 (62.3)	45 (84.9)	44 (83.0)	26 (49.1)	53
Red Pepper		91 (98.9)	101 (109.8)	114 (123.9)	100 (108.7)	74 (80.4)	92

Source: Data collected from the survey.

1) Figures in parentheses denote percentage to that of existing land

dropped as time passes. However, sweet potato and red pepper reached the level of average unit yields from the existing upland in their 2nd and 5th years of operations, respectively. Except for these two crops, all other crops showed sharp drops in yields in the years of 1976 and 1977 due to severe drought. From the above survey results, it is apparent that the 6 major crops started with low productivities in 1972 and achieved the level of average unit yield from the existing upland in 1977. Furthermore, yields of sweet potato and red pepper exceeded the level of average unit yield from the existing upland in 1977, achieving 104.3 per cent and 108.7 per cent, respectively.

The above situations imply that the major crops in the upland reclaimed areas are able to achieve their productivities similar to that of the upland existing lands in their 5th to 7th years of operations after the reclamation projects were implemented. This is because the farmers in the reclaimed area must have devoted more efforts to improve the soil conditions than they or the other farmers would do for the existing lands. However, it is also necessary to note the fact that the crops from the reclaimed areas were more susceptible and sensitive to droughts than the crops from the existing upland areas.

3. Farm Incomes and Net Returns from Reclaimed Areas

There have been a lot of variations in farm incomes by year among the crops as can be seen from Table 8. According to the table, it was found that the farm incomes from 10 areas of 72 reclaimed areas was realized highest in its 5th year of operation, that is, in 1976. Red pepper brought in the highest income with 63, 392 won, achieving 113.4 per cent of the average farm income of the existing upland. Sweet potato was next to red pepper in bringing in farm incomes, showing 50,681 won achieving 117.3 per cent of the average farm income of the existing upland. It is interesting to note that income from red pepper exceeded that from the existing upland area in farmeis third year of operation, showing 125.9 per cent of the average farm income of the existing upland, whereas sweet potato and upland rice in their fourth year. On the contrary, however, soybean, barley and sesame achieved 84.7 per cent, 58.4 per cent and 76.3 per cent of the average farm income of the existing upland in 1976 when these crops showed the highest incomes.

One of the ways of deriving net incomes or net returns is to subtract the production costs from total revenues by crop in respective year.

Table 8. Annual Farm Incomes by Crop From 10 areas of 72 Reclaimed Area.

(Unit: 1,000 won)

Crop \ Year	72	73	74	75	76	77
Soybean	1,993 (25.0)	2,548 (30.3)	5,068 (41.3)	6,740 (46.4)	14,614 (87.4)	9,417 (44.7)
Barley	-	2,734 (19.2)	8,573 (43.6)	12,521 (60.2)	13,027 (58.4)	1,134 (4.0)
S. Potato	7,697 (47.5)	14,603 (69.8)	24,398 (71.1)	36,791 (101.6)	50,681 (177.3)	20,726 (41.3)
Red-pepper	-	31,257 (92.2)	74,794 (128.9)	84,839 (114.2)	65,392 (113.4)	24,437 (59.2)
Sesame		9,819 (50.1)	13,093 (50.4)	34,777 (81.1)	28,613 (76.3)	13,654 (30.1)
Upland rice			18,156 (84.1)	28,153 (110.5)		

Table 9 shows annual net incomes by crop from 10 areas of 1972 reclaimed areas. Soybean showed loss in almost every year, except for 1976, bringing in losses of 1,657 won in 1974 and 4,111 won in 1977. Barley also brought in losses of 2,769 won in 1973 and of 22,826 won in 1977, while red pepper in loss of 16,428 in 1977 only because of severe drought in that year. However, rest of the crops brought in positive net incomes in almost every year. Particularly red pepper achieved 146.9 per cent of the net farm incomes of the existing upland areas in 1974, whereas sweet potato and upland rice achieved the similar level of net incomes from existing upland areas in 1975, respectively.

Looking from the above situations, it is very useful to note that the net incomes vary among the crops, depending upon whether conditions, unit yields per unit land area, and prices of crops that the farmers receive from their sales of crops in that particular year.

Table 9. Annual Net Returns by Crop from 10 Areas of 72 Reclaimed Area

(Unit: won)

Crop \ Year	72	73	74	75	76	77
Soybean	2,524 (42.6)	2,747 (44.7)	1,657 (57.0)	1,803 (11.3)	4,485 (68.0)	4,111 (35.2)
Barley		2,769 (69.5)	687 (7.3)	1,299 (17.3)	1,801 (29.2)	22,826 (79.0)
Sweet Potato	3,167 (29.8)	9,413 (64.0)	17,224 (65.5)	26,916 (104.3)	38, (124.4)	3,604 (12.0)
Red Pepper		17,349 (92.6)	56,581 (146.9)	59,562 (121.6)	34,835 (128.5)	16,423 (97.1)
Sesame		2,031 (18.7)	2,548 (17.3)	20,178 (71.3)	10,898 (55.1)	10,251 (47.4)
Upland Rice			10,115 (82.4)	16,934 (126.1)		

1) Figures in parentheses represent the per cent of net returns from 10 areas of existing upland.

VI. THE ECONOMIC EVALUATION OF UPLAND RECLAMATION PROJECTS

1. Investment Validity Analyses

A. Assumptions

i) Every measures for costs and incomes were applied to one hectares of reclaimed areas that were developed during the period of 1972-1977.

ii) It is assumed that the cropping patterns for 1977 will continue over the 50 years in the surveyed reclamation areas.

iii) Various crop yields were estimated for 8 years[1] by applying the yield measures that the Agricultural Development Corporation has filed as can be seen in Table 10.

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1) Regression Coefficients of Various Crop yields for the 1972-1977 projects. (con't)

The annual measures of yields for other crops not included in this survey such as radish, oilseed, watermelon and fruits were provided by Agricultural Development Corporation, Korea, for the projection purposes.

B. Gross Revenues

Gross revenues from one hectare of reclaimed land area by individual project were obtained by multiplying the yield measures by crop by the 77 farm prices received. Gross revenues by crop were also employed to estimate the gross revenues from one hectare of land areas by multiplying the crop patterns by crop acreages, shown in Tables 11 and 12.

C. Costs

Production costs and management costs per hectare of reclaimed land of each individual project were estimated on

Crops	Regression Coefficients	R^2
Barley	Y = 43.80 + 8.25 X	0.93
Soybean	Y = 56.63 + 7.69 X	0.99
Sweet Potato	Y = 68.90 + 5.76 X	0.85
Upland rice	Y = 57.80 +12.79 X	0.90
Red-pepper	Y = 67.49 +11.89 X	0.73
Sesame	Y = 59.85 + 6.58 X	0.88
Tobacco	Y = 70.30 +11.10 X	0.40

Table 10. Estimated Yields by Crop From 10 areas of 72 Reclaimed Land Areas

Crop \ Year	1th	2th	3th	4th	5th	6th	7th	8th	Existing land
Soybean	65	73	80	88	96	101	101		101
	(64.3)	(72.0)	(79.7)	(87.4)	(95.1)	(100.0)	(100.0)		
Barley		114	132	150	168	186	204	219	219
		(52.1)	(60.3)	(68.6)	(76.8)	(85.1)	(93.3)	(100.0)	
S. Potato	1,052		1,215	1,295	1,377	1,409	1,409		1,409
	(74.7)	(80.4)	(86.2)	(91.9)	(97.7)	(100.0)	(100.0)		
Red pepper	77	89	97	97					97
	(79.4)	(91.3)	(100.0)	(100)					
Sesame	31	34	37	41	44	47	47		47
	(66.4)	(72.3)	(78.7)	(86.2)	(92.8)	(100.0)	(100.0)		
Peanuts	64	73	91	812					91
	(70)	(80)	(100)	(100)					

Year / Crop	1th	2th	3th	4th	5th	6th	7th	8th	Existing land
Oilseed	119 (70)	106 (88)	170 (100)	170 (100)					170
Radish	1,850 (80)	2,312 (180)	2,312 (100)						2,312
Water Melon	1,600 (80)	2,000 (100)	2,000 (100)						2,000
Upland rice	102 (66.4)	112 (73.0)	122 (79.6)	132 (86.2)	142 (92.8)	153 (100.3)			153
Apple									2,764
Tobacco	105 (46.0)	166 (72.8)	211 (92.5)	218 (95.6)	228 (100.0)				228

1) Figures in parentheses are the estimated yields

the basis of the above data, and the estimated production costs by crop and management costs by crop shown in Appendix Table 1, were also applied to estimate the costs per one hectare of reclaimed area.

D. Farm Incomes and Net Revenues

Farm incomes and net revenues per hectare of reclaimed land areas for each individual project were also estimated on the basis of the above data.

E. Investment Costs

Investment costs shown in Table 6 were also employed to measure the present values of the past investment costs, by reflecting the annual price increases shown in Appendix Table 2.

2. The Results of B/C Analyses

The results of B/C analyses are summarized in Table 13. According to the Table, the average Internal Rate of Return for 12 projects is found to be 22.6 per cent and its B/C ratio[2)]

2) B/C ratios were computed by discounting the streams of costs and benefits over 50 ears, discounted at discount rate of 10.5 per cent. This is because the interest rate for loan was 10.5 per cent.

to be 3.56. IRR for 77 IBRD projects is found to be 22.3 per cent and its B/C ratio is found to be 2.63, and thus showing the fact that the projects, on the average, are showing their economic validity with relatively great percentages of IRRs and B/C ratios.

It is also interesting to note that the lowest B/C ratio among the 12 B/C ratios for 12 projects is 1.2, and thus proving that all investment projects are economically valid. However, IRRs and B/C ratios are in a great variation, having Hyungyong with 29.9 per cent of IRR, Songcheon with 29.1 per cent, Shinbuk with 26.4 per cent, Hakdong with 25.0 per cent, Gochang with 23.3 per cent and Ochang with 20.5 per cent, respectively. Most of them showed relatively high IRRs, showing IRRs greater than the average.

On the contrary, Songam and Taean located in west cost of Chungcheongnam Do showed relatively low IRRs with 12.1 per cent and 12.8 per cent.

Icheon, Dukjol and Songam also appear to show smaller IRRs than average for the 12 projects.

Table 11. Crop Patterns by Individual Project

Project		U. rice	Barley	Soybean	S. Potato	R. pepper	Peanuts	Tobacco	Sesame	Radish	Water melon	Apple	Acreage ratio	Idle land ratio
PY 72	Taean		52.2	71.0	2.4	1.5	14.2	2.5	3.4			5.0	152.2	
	Shinbuk	2.6	40.4	28.1	6.7	4.4			15.1	49.1	37.8		184.2	
													170.2	
	Icheon	9.8		25.9	26.5	5.3		4.0	9.2	9.5	3.4	16.9	110.5	
PY 74	Gochang	5.8	16.9	17.0	4.0	4.2	7.4	11.9	9.2	25.2	25.2	15.5	142.3	
													138.9	
	Samsung	10.7		35.7	3.7	24.2		31.6	11.6	2.1		5.8	125.4	2.5
PY 75	Hyungyong		34.9	15.3	44.5	11.7	9.3	5.4	11.1	4.3		1.5	138.0	7.9
													130.0	
	Ochang	4.6		36.1	13.8	7.6		45.4	2.8	25.0			135.3	
PY 76	Hakdong	23.8	19.7	15.7	13.4	2.3		7.6	6.8	18.0	4.7		112.0	13.5
													120.0	
	Dukjol	18.3		29.4	5.2	9.2	12.0		11.4		10.0		95.5	4.5
	Songam	2.8	16.2	27.1	1.4	0.5	41.5		7.6				97.1	15.5
PY 77	Oju	5.0		31.2	13.2	13.3	11.0	3.5	13.7	19.9	9.1		119.9	
	Songcheon	7.7	25.8	4.3	3.6	0.7	30.4	3.0	23.0	54.4			152.9	1.4
	Subtotal	8.3	13.4	20.1	5.0	4.6	25.9	5.2	15.1	17.5	5.5		120.6	
Total													136.9	

Table 12. Crop Acreages by Individual Project

Project year	Project \ Crop	Soybean	Barley	S. Potato	Red Pepper	Peanuts	Tobacco	Sesame	Upland rice	Water melon	Radish	Apple	Total
PY 72	Taean	73.8	54.3	2.5	1.6	14.8	2.6	3.5				5.2	158.3
	Shinbuk	37.4	67.0	8.9	5.9			20.0	3.5	50.3	52.0		245.0
PY 74	Icheon	70.4		72.1	14.4		10.9	25.0	26.6	9.2	25.8	45.9	300.3
	Gochang	382.8	380.6	90.1	94.6	166.7	268.0	207.2	130.6	567.5	567.5	349.1	3,204.7
PY 75	Samsung	92.5		9.6	62.7		81.8	30.0	27.7		5.4	15.0	324.7
	Hyungyong	23.0	52.4	66.7	17.5	14.0	8.0	16.7			6.4	2.3	207.0
PY 76	Ochang	13.7		5.3	2.9		17.3	1.1	1.8		9.4		51.5
	Hakdong	11.5	14.5	9.9	1.7		5.6	5.0	17.3	3.5	13.2		82.2
PY 77	Dukjol	32.5		5.7	10.2	12.6		13.3	20.2	11.1			105.6
	Songam	35.4	21.0	1.8	0.7	54.2		9.9	3.7				126.7
	Oju	26.2		11.1	11.1	9.2	2.9	11.5	4.2	16.7	7.0		100.5
	Songcheon	7.9	47.3	6.6	1.3	55.7	23.8	42.1	14.1		81.4		280.2
	Subtotal	102.0	68.3	25.2	23.3	131.7	26.7	76.8	42.2	27.8	89.0		613.0
	Total	807.1	637.1	290.3	224.6	327.2	420.9	385.3	249.7	658.3	768.7	417.5	5,186.7

Table 13. IRRs and B/C Ratios by Project

Project		IRR	Net Reclaimed Area	B/C Ratio	Remarks
PY 72	Taean	12.8	104	1.38	Located in west cost of Chungnam Do. Poor soil capabilities. Barley and soybeans are the major crops
	Shinbuk	26.4	133	3.55	Located in the suburban area of Kwangju City. Watermelon and Radish are the major crops and the cropping rates are very high. Good water supply.
PY 74	Icheon	17.8	271.89	2.53	Fruits are major crops. Planting acreage rates are very low. Relatively high rate of outmigration causes the shortages of farm labor.
	Gochang	23.3	325.2	4.29	Largest reclamation area and thus generates large scale economies of the project. Watermelon and radish are the major cash crops.
PY 75	Samsung	20.0	259	3.86	Remote farming in Chungbuk Do, Tobacco and Red pepper are the major cash crops. Use of green houses are well developed.
	Hyungyong	29.9	150	3.98	Located in Chunnam Do. Sweet potato is the major crop.
PY 76	Ochang	20.5	38.05	2.59	Located in Chungju suburban area with such cash crops as Tobacco and peanuts.
	Hakdong	25.0	73.58	3.02	Located nearby Shinbuk, Chongnam Do. Watermelon and Radish are the major cash crops. Very good soil capabilities.
PY 77	Dukjol	19.3	110.51	2.10	Ratio of Idle land is relatively high duet to the close access to Suwon city and Seoul.
	Songam	12.1	130.48	1.20	Located nearby Taean. Similar natural conditions to that of Taean. Idleland ratio was 15 per cent in 1977 due to severe drought.
	Oju	24.2	8.385	24.67	Good soil capabilities. Fruits are cash crops.
	Songcheon	29.1	183.24	4.32	Located in the Southern Part of Chonnam Do. Good soil capabilities. Watermelon and Radish are major cash crops
77 Average		22.3	-	2.63	
Overall average		22.6	-	3.56	

1) 10.5 per cent of discount rate was applied to derive the B/C ratios, for the loan was made for 10.5 per cent of interest rate.

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3. Farmer's Repayment Capacity

Farmer's repayment capacity was measured based on the data collected from the four 77 IBRD projects reclaimed in 1977.

Farm incomes per hectare of the 77 IBRD reclaimed areas were computed on the basis of total revenues and production costs by crop from one hectare of reclaimed land areas, and on the estimated construction costs per hectare of reclaimed areal.

Table 14 indicates the fact that a farm had the farm income of 308 thousand won from the farm operation on one hectare of 77 IBRD reclaimed land in its first year of operation. Farm incomes have gradually increased and finally increased to 630 thousand won in its 7th year of farm operations.

According to the analytical results that can be seen from Table 15, it is found that farms have a repayment capacity both with and withought its family living expenditures subtracted. In their first year of farming, the farms had repayment capacity, showing income balances of 72.6 thousand won, 82.6 thousand won and 92.6 thousand won, respectively, in the cases of 40 per cent, 30 per cent and 20 per cent loans of the total construction.

Table 14. Farmer's Repayment Capacity in the 77 IBRD Reclamation Project Areas.

(Unit: 1,000 won)

Year	Construction costs/ha	Farm Incomes (1)	Loan Repaid by different Cost-sharing Ratio			Repayment capacity Indicators			Remarks
			(2) (40%)	(3) (30%)	(4) (20%)	(1)-(2) 40%	(1)-(3) 30%	(1)-(4) 20%	
1		308	41	31	21	267	277	287	
2		461	41	31	21	420	430	440	
3		525	41	31	21	484	494	504	
4	981	582	105	79	52	477	503	530	
5		608	105	79	52	503	529	556	
6		627	105	79	52	522	548	575	
7		630	105	79	52	525	551	578	
8		630	105	79	52	525	551	578	

construction costs[3]

This constrasts to the results that the Interim Report of NAERI "Economic Evaluation of Upland Reclamation Project" showed in 1977 with a statement that the farms were only able to repay the debt from the 4th year even when the percentage of cost sharing (loan) was 20 per cent of the total costs[4].

The reasons why the 77 IBRD project farms will have such a successful repayment capacity on both 40 per cent, 30 per cent and 20 per cent loan of total construction costs are found to be as follows;

1) Farmers on the 77 IBRD project areas have been fully knowledged with how to have their best crop patterns based on the experiences from the other farmers who have experience somewhere else, and

2) Farmers on the 77 IBRD project areas had favorable financial assitances particularly in their loans with favorable terms as were stated in the early pages of this text.

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3) In the case of the IBRD project, farmer are granted a loan amounting to 40 per cent of total construction costs at 10.5 per cent annum for 5 years with 3 year grace period.

4) NAERI, Economic Evaluation of Upland Reclamation Project Interim Report, 1977, p.13.

VII. SOCIO-ECONOMIC EFFECTS OF THE PROJECTS

Since the upland reclamation areas are usually located in the mountaineous and hilly areas of the county, there are a lot of reclaimed land areas that are owned by absentee landlords, large farm, and clans. A lot of owners do not operate farms and thus renting high percentages of the total reclaimed areas to the tenants.

Table 16 indicates that about 30.7 per cent of the total reclamation area was leased to the tenants, whereas only

Table 16. Present Status of Reclaimed Upland Cultivation, 1978

Size of Existing Farmland	% of leased land			% of leased acreage per farm		
	Paddy	Upland	Reclaimed	Paddy	Upland	Reclaimed
landless	-	-	44.7	-	-	13.9
1500 pyongs	23.3	22.8	42.4	2.7	1.7	4.4
1501-3000	29.4	19.2	48.2	5.6	3.6	4.5
3001-4500	11.7	10.0	29.6	4.4	4.4	4.7
4501-6000	4.9	6.3	8.5	3.9	3.3	3.9
Over 6001 pyongs	1.6	-	9.5	8.0	-	4.7
average	10.4	10.2	30.7	4.3	2.9	5.4

Table 15. Repayment Capacy Tested by Comparing the Loan Plus Using Costs with Farm Household Incomes

(Unit: 1,000)

Year	Farm Household Income			Amount of Loan Repayed				Total expenditure (A + B)			Repayment Capacity Indicators		
	Reclaimed farm income	Off-farm income 1)	Farm House-hold income	40%	30% (A)	20%	Average Farm Household living costs (B)	40%	30%	20%	40%	30%	20%
1	308	58.5	366.5	41	31	21	252.9	293.9	283.9	273.9	726	82.6	92.6
2	461	88	549	41	31	21	379.0	420	410	400	129.0	139.0	139.0
3	525	100	625	41	31	21	431.1	472.1	462.1	452.1	152.9	162.9	172.9
4	582	111	693	105	79	52	478.2	583.2	557.2	530.2	109.4	135.8	162.8
5	608	115.5	724	105	79	52	499.6	604.6	578.6	551.6	119.4	145.4	172.4
6	627	120	746	105	79	52	515.0	620	594	567	126.0	152	179.0
7	630	120	750	105	79	52	517.5	622.4	596.5	569.5	127.6	153.5	150.5
8	630	120	750	105	79	52	517.5	622.4	596.5	569.5	127.6	15.35	180.5

1) Off-farm income = 19 per cent of Reclaimed farm incomes.
2) Living costs = 69 per cent of Farm household Incomes

10.2 per cent of the total existing upland and 10.4 per cent total existing paddy were rented. It is found that the percentages of acreage rented were small as the size of farms increased, and vice versa.

In the case of existing lands, the percentage of land areas leased for the farms with the size less than 1,500 pyongs was 22.3 per cent, while that for the farms with the size that falls between 4,501 pyongs and 6,000 pyongs was only 6.3 per cent.

On the contrary, the reclaimed land areas showed much higher percentages of land areas leased. The farms with the size that fall in between 1,501 pyongs and 3,000 pyongs showed 48.2 per cent of reclaimed land areas leased, whereas the farms with size of 4,500 pyongs showed 40 per cent of land areas leased. In contrast, the farms with the sizes of greater than 4,500 pyongs showed only 10 per cent of reclaimed land leased.

The survey results also indicate that the per cent land areas leased per farm were also relatively large, compared to that of existing farms. Table 16 shows that the proportion of existing upland areas leased per farm was 2.9 per cent, whereas that of reclaimed areas leased per farm was 5.4 per cent.

The opinion survey results also indicate that about 86.8 per cent of the total farmers in the reclaimed land areas showed their strong favors for the continuation of the upland reclamation projects. 92.2 per cent of the farmers in the 72 reclaimed areas showed their wishes for the continuation of the projects, whereas about 72 per cent of the total farmers in the 77 IBRD project areas expressed their wishes for the project continuation.

As can be seen from Table 17, one of the interesting things regarding the farmers' poinions on whether the projects should be continued is that the percentages of the farmers who showed favor increase as the time passes after the reclamation projects were implemented. This can be interpreted as implying that most of the farmers are enjoying favorable farm incomes from farm operations on the reclaimed land areas with ever increasing soil capacities as the time passes.

Farmers are facing problems with farm operations depending on their individual situations.

Survey results indicate that, on the average, 90.7 per cent of the farms are experiencing difficulties with

Table 17. Farmer's Opinions on Project Continuation

(Unit: %)

Class	Favor	Against	No Answer	Others	Total
Total	86.8	8.5	4.7	-	100.0
PY 72	92.2	3.1	4.7		100.0
PY 74	87.2	9.0	3.8		100.0
PY 75	89.6	7.0	3.4		100.0
PY 76	87.4	5.2	7.4		100.0
PY 77	72.0	24.0	4.0		100.0
Small farms	70.4	4.4	5.2		100.0
Medium farms	86.4	9.5	4.1		100.0
Large farms	84.4	10.6	5.0		

their farm operations.

Table 18 shows that 31.3 per cent of the problems that the farmers are facing is the shortage of farm labor, whereas 15.4 per cent is the shortage of farm operation funds. The second highest percentage (24.4 per cent) of the problems arise out of poor soil capabilities. However, the problem of soil capabilities appears to be less problematic as the time passes after the farm is open.

The Table also shows the problems by cause and by size of the farms. About 88.6 per cent of small farms express that they have operational problems, whereas 90.8 per cent of the large farms are experiencing the problems.

It is very interesting to note that the small farms are experiencing far greater problem of shortage of operation funds with 23.7 per cent, than the larger farms with only 7.8 per cent. In contrast, 16.7 per cent of small farms are experiencing the shortage of farm labor, while 46.1 per cent of large farms are experiencing it.

Although problems caused by poor soil capacity occupy somewhat greater than 20 per cent, their degree do not vary a great deal among the different farm sizes, showing 26.3 per cent,

Table 18. Difficulties in Farm Operations by type

(Unit: %)

Class		Difficulties						No Difficulties	Total
		Shortage of Operation Fund	Shortage of Technology	Shortage of labor	Poor soil Capacity	Others	Sub-total		
Total		15.4	2.3	31.3	24.4	16.9	90.7	9.7	100.0
PY 72		23.4	1.6	37.5	14.1	15.6	92.2	7.8	100.0
PY 74		21.8	5.1	35.9	11.5	15.4	89.7	10.3	100.0
PY 75		4.3	-	27.0	32.2	23.5	87.0	13.0	100.0
PY 76		22.1	5.2	28.4	23.2	14.7	91.6	8.4	100.0
PY 77		8.0	2.0	32.0	42.0	10.0	94.0	6.0	100.0
Size of farms	Small	23.7	3.5	16.7	26.3	18.4	88.6	11.4	100.0
	Medium	16.3	2.7	28.6	24.5	19.0	91.1	8.9	100.0
	Large	7.8	0.7	46.1	22.7	13.5	90.8	9.2	100.0

24.5 per cent, and 22.7 per cent, respectively.

The results indicate that, on the average, the smaller the farm sizes are, the greater problems with operation funds they have, and vice versa. On the contrary, the larger the farm sizes are, the greater the problems with labor shortage is. These situations can be interpreted as implying that small farms have greater problems with operation funds than the large farms have, while housing smaller problems with labor shortages than the large farms experience. This can be interpreted as implying that the recent problems that the farms are experiencing shift from problems of fund shortages to that of labor shortages.

VIII. CONCLUSIONS AND POLICY RECOMMENDATIONS

Looking from the analyses so far, it can be said the upland reclamation projects in Korea have been relatively successful. Particularly it has to be pointed that high profitabilities are usually guaranteed if the farmers have favorable planting patterns with cash crops as they wish.

It was found, thanks to the reclamation projects, that the farmers happen to have larger farm sizes than the national average, that the farmers in the reclaimed areas enjoy far greater incomes than the other farmers might, and that the socio-economic status of the farmers in the upland development areas has been tremendously improved. As a result they would like to continue the reclamation project or at least they would like to recommend the others to participate in the projects.

However, there are a few comments and recommendations to be considered so that the policy makers might have find some avenues in which the future upland reclamation projects can be more effectively implemented.

1) There needs a sound mechanism and institution through which knowledges and technologies are always available for the farmers to maintain and protect the soil capability after the

reclamation project is implemented.

2) High percentages of land lease and idle lands represent the dissatisfaction of the farmers against their current land uses. Therefore, there needs an intitutional measure to let the farmers easily change their uses of land into whatever directions they would like to and operate their farms with the crop patterns they would like to have.

3) As was seen, the pressure from the shortages of labor gradually becomes a heavy burden on farmer's shoulder without mechanizations. Therefore there needs assistances to the farmers so that they might mechanize their farm operations.

4) In the selection of reclamation areas in the future, soil capabilities, possibilities of having favorable cash crop combinations and the scales of the projects should be considered with relatively high priorities, for they affect farm incomes the most.

5) In the selection of reclamation areas in the future, the choice has to be made in such a way that the projects do not harm the natural environments, for there rapidly grows a great demand for recreational areas and open spaces.

Appendix

Appendix Table 1. Annual Revenues and
10 areas of Reclaimed

Crop	Class	Item	'72
Soybean	Existing land	Gross Rev.	12,644
		Mgt. Costs	4,843
		Production cost	9,368
		Farm Incomes	7,801
		Net Incomes	3,326
	Reclaimed land	Gross Rev.	8,262
		Mgt. Costs	4,692
		Prod. Costs	9,209
		Farm Incomes	3,570
		Net incomes	949
Barley	Existing land	Gross Rev.	20,331
		Mgt. Costs	6,371
		Produc. Costs	13,521
		Farm Incomes	13,960
		Net Incomes	6,810
	Reclaimed land	Gross Rev.	-
		Mgt. Costs	-
		Prod. Costs	-
		Farm Incomes	-
		Net Incomes	-

Costs by Crop per Area

(Unit: Won/10 a)

'73	'74	'75	'76	'77
13,907	19,264	23,828	28,356	35,229
5,624	7,166	9,526	11,916	14,494
10,653	13,642	17,908	22,045	20,022
8,283	12,096	14,302	16,440	20,735
3,254	5,622	5,920	6,311	7,207
10,052	15,067	20,996	26,952	35,229
5,576	7,139	9,538	12,057	14,650
10,871	13,864	18,0[illegible]	22,186	28,178
4,476	7,928	11,458	14,895	20,579
819	1,203	2,915	4,766	7,051
22,366	30,209	35,548	42,029	50,897
6,841	8,822	12,751	17,344	20,242
14,798	19,066	26,033	33,448	41,934
15,525	21,387	22,797	24,685	30,655
7,968	11,143	9,515	8,581	8,963
8,871	17,081	24,149	32,985	43,810
6,792	8,503	12,383	17,422	20,786
12,295	16,389	23,605	232,250	42,470
2,079	8,578	11,766	15,563	23,024
3,424	692	544	735	1,332

Crop	Class	Item	'72
Sweet-potato	Existing land	Gross Rev.	24,695
		Mgt. Costs	8,182
		Production Cost	13,762
		Farm Incomes	16,513
		Net Incomes	10,933
	Reclaimed land	Gross Rev.	16,109
		Mgt. Costs	8,417
		Prod. Costs	12,947
		Farm Incomes	7,692
		Net incomes	3,162
Upland rice	Existing land	Gross Rev.	20,450
		Mgt. Costs	6,120
		Produc. Costs	12,616
		Farm Incomes	14,330
		Net Incomes	7,834
	Reclaimed land	Gross Rev.	-
		Mgt. Costs	-
		Prod. Costs	-
		Farm Incomes	-
		Net Incomes	-

(Unit: Won/10 a)

'73	'74	'75	'76	'77
30,792	47,102	53,200	65,242	77,132
9,470	12,207	16,324	21,196	25,928
15,686	20,209	26,710	33,824	43,050
21,322	34,895	36,876	44,046	51,204
15,106	26,893	26,490	31,428	34,082
24,451	38,100	48,211	65,379	77,296
9,680	12,273	16,562	21,509	26,276
14,870	19,447	26,437	34,137	43,398
14,771	25,827	31,649	43,870	51,020
9,671	18,653	21,774	31,232	33,898
-	32,594	40,329	47,981	54,310
-	8,843	12,164	15,615	18,353
-	18,141	24,208	30,182	37,856
-	23,751	28,165	32,366	35,957
-	14,453	16,121	17,799	16,454
-	38,026	43,017	-	54,310
-	9,223	12,445	-	18,671
-	17,264	23,664	-	38,174
-	28,803	30,572	-	35,639
-	20,762	19,353	-	16,136

Crop	Class	Item	'72
Red pepper	Existing land	Gross Rev.	59,802
		Mgt. Costs	14,293
		Production Cost	27,931
		Farm Incomes	45,509
		Net Incomes	31,871
	Reclaimed land	Gross Rev.	62,242
		Mgt. Costs	16,757
		Prod. Costs	28,793
		Farm Incomes	45,485
		Net Incomes	33,449
Sesame	Existing land	Gross Rev.	24,976
		Mgt. Costs	5,531
		Produc. Costs	13,386
		Farm Incomes	19,645
		Net Incomes	11,590
	Reclaimed land	Gross Rev.	-
		Mgt. Costs	-
		Prod. Costs	-
		Farm Incomes	-
		Net Incomes	-

(Unit: Won/10 a)

'73	'74	'75	'76	'77
52,997	83,973	109,218	99,997	89,523
15,865	20,797	28,267	36,212	42,682
31,024	40,315	53,544	66,769	83,547
37,132	63,176	80,951	68,785	46,841
21,973	43,658	55,674	33,228	5,976
55,161	93,398	128,164	101,018	89,523
17,955	22,388	28,879	36,646	43,162
31,863	41,101	54,156	67,203	84,027
37,206	71,010	99,285	64,372	46,361
23,298	52,297	74,008	33,815	5,496
26,219	34,490	54,547	52,330	63,412
6,171	7,890	10,679	13,918	16,743
14,914	19,147	25,278	31,633	40,648
20,048	26,600	43,868	33,412	46,669
11,305	15,343	29,269	20,697	22,764
16,325	24,078	42,196	46,406	63,412
6,218	8,003	10,719	14,064	16,905
14,006	18,548	25,318	31,779	40,810
10,107	16,075	31,477	32,342	46,507
2,319	5,530	16,878	14,627	22,602

Crop	Class	Item	'72
Radish	Existing land	Gross Rev.	32,499
		Mgt. Costs	9,961
		Production cost	18,277
		Farm Incomes	22,538
		Net Incomes	14,222
	Reclaimed land	Gross Rev.	-
		Mgt. Costs	-
		Prod. Costs	-
		Farm Incomes	-
		Net Incomes	-
Water-melon	Existing land	Gross Rev.	47,040
		Mgt. Costs	16,170
		Produc. Costs	32,141
		Farm Incomes	30,870
		Net Incomes	14,899
	Reclaimed land	Gross Rev.	-
		Mgt. Costs	-
		Prod. Costs	-
		Farm Incomes	-
		Net Incomes	-

(Unit: Won/10 a)

'73	'74	'75	'76	'77
42,320	67,459	92,000	84,019	86,480
10,675	13,824	19,520	26,533	30,791
19,919	25,727	34,935	45,171	55,727
31,645	53,635	72,480	57,485	55,689
22,401	41,732	57,065	38,843	30,753
42,320	67,459	92,000	84,019	86,480
11,341	14,106	19,724	26,808	31,097
20,841	26,009	35,139	45,446	56,033
30,979	53,353	72,276	57,211	55,383
21,479	41,450	56,861	38,573	30,447
-	-	-	-	128,436
-	-	-	-	48,568
-	-	-	-	96,455
-	-	-	-	79,868
-	-	-	-	31,981
62,720	78,400	124,684	106,764	128,436
18,619	23,172	31,672	41,223	149,072
36,628	46,029	61,276	77,017	96,959
44,101	55,228	93,012	65,541	80,364
26,092	32,371	63,408	29,747	31,477

Crop	Class	Item	'72
Tobacco	Existing land	Grow Rev.	95,691
		Mgt. Costs	39,046
		Prod. Costs	61,536
		Farm Incomes	56,645
		Net Incomes	34,155
	Reclaimed land	Gross Rev.	-
		Mgt. Costs	-
		Prod. Costs	-
		Farm Incomes	-
		Net Incomes	-

(Unit: Won/10 a)

'73	'74	'75	'76	'77
103,372	129,518	157,555	194,067	207,560
43,562	57,894	75,156	91,269	110,857
68,556	90,075	116,826	141,625	178,137
59,810	71,624	82,399	102,798	96,703
34,816	39,443	40,729	51,142	29,423
-	-	-	-	207,560
-	-	-	-	111,415
-	-	-	-	178,695
-	-	-	-	96,145
-	-	-	-	28,865

Appendix Table 2. Price Index Used for Revalued Construction Costs

Type	1972	1973	1974	1975	1976	1977
Wholesale Price Index	52.0	55.6	79.1	100.0	112.1	122.2
W. P. I. as 1977=100	42.5	45.5	64.7	81.8	91.7	100

Appendix Table 3. Farm Prices Received by Farmers by Crop for 77 crops

Crop		Applied Standards		(1)+(2)
Barley	202.6	77 govt. purchasing price for 2nd class	21.5	224.1
Soybean	325.0	77 "	22.6	347.6
S. Potato	54.5	77 government price and farm price. Ratio=50:50	4.1	38.6
U. Rice	328.8	77 govt. purchasing price for 2nd class	42.2	362.5
Corn	166.0	77 "	37.7	183.5
R. Pepper	956.7	77 Farm prices in Harvest season	14.9	972.6
Sesame	1,119.6	77 "	18.1	1,127.6
Tobacco	1,030.0	77 Monopoly Office Price Ratio: Fluecured 50: Burley 50	11.7	1,041.7
Radish	48.8	75, 76, 77 Average price	-	48.2
Watermelon	91.5	77 Farm prices in harvest season	-	81.5
Peanuts	810.0	77 "	-	855.8
Oilseed	225.0	77 "	12.2	237
Apple	193.4	777 "	1.8	195.2

Appendix Table 4. Changes in Land Value in Survey Area

(Unit: won/pyong)

Project		Paddy			Upland			Reclaimed		
		Before	After	Rate (%)	Before	After	Rate (%)	Before	After	Rate (%)
PY 72	Taean	770	3,480	352	490	2,410	391.8	210	1,050	400.0
	Shinbuk	723	2,170	200	380	1,160	205.3	150	750	400.4
PY 74	Icheon	1,580	3,730	136.0	580	1,820	213.8	290	1,800	610.7
	Gochang	1,410	2,600	84.0	430	1,170	172.1	180	630	250.0
PY 75	Samsung	1,810	3,020	67.0	1,250	2,010	60.8	410	1,020	148.7
	Hyungyong	1,830	3,060	67.2	1,090	1,980	172.5	350	970	177.2
PY 76	Ochang	2,590	4,380	69.5	1,880	2,750	46.3	430	1,930	127.9
	Hakdong	1,580	2,550	61.4	780	1,180	51.3	380	680	78.9
PY 77	Dukjol		4,380			2,250			1,500	
	Songam		3,600			2,010			750	
	Oju		3,070			1,340			850	
	Songcheon		2,950			970			400	

Appendix Table 5. Management Costs by Crop Planting Acreage in 77 Reclaimed Areas

Crop		1	2	3	4	5	6	7	8	Existing land Mgt. costs
U. Rice	42.2 ha	5,872 (111.8)	5,667 (107.9)	5,498 (104.3)	5,372 (102.3)	5,346 (101.8)	5,341 (101.7)	Same as the 6th Column	Same as the 6th Column	241,670 ha
Soybean	102.0	14,325 (96.9)	14,665 (99.2)	14,725 (99.6)	14,799 (100.1)	14,961 (101.2)	14,947 (101.1)			144,940
S. Potato	25.2	6,723 (102.9)	6,678 (102.2)	6,566 (100.5)	6,632 (101.5)	6,632 (101.5)	6,619 (101.3)			259,280
Red pepper	23.3	11,655 (117.2)	11,258 (113.2)	10,710 (107.7)	10,164 (102.2)	10,064 (101.2)	10,054 (101.1)			426,820
Sesame	76.8	13,077 (101.7)	12,961 (100.8)	13,038 (101.4)	12,909 (100.4)	12,999 (101.1)	12,987 (101.0)			167,430
Peanuts	131.7	39,269 (106.6)	38,017 (103.2)	37,575 (102.0)	37,575 (102.0)	36,838 (100.0)	36,838 ( )			279,710
W. melon	27.8	15,143 (111)	14,501 (106.3)	13,860 (101.6)	13,792 (101.1)	13,792 (101.1)	13,792 (101.0)			490,720
Barley	68.3	-	13,728 (99.3)	13,327 (96.4)	13,424 (97.1)	13,894 (100.5)	14,198 (102.7)			202,420
Tobacco	26.7	26,922 (90.5)	27,130 (91.2)	28,469 (95.7)	29,242 (98.3)	29,926 (100.6)	29,897 (100.5)			1,114,150
Radish	89.0	30,582 (110.5)	29,392 (106.2)	28,229 (102.0)	27,953 (101.0)	27,953 (101.0)	27,953 (101.0)			310,970
Total		163,568	173,997	187,196	171,863	172,405	172,626			