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A POST-EVALUATION STUDY ON MINOR RIVER TRAINING PROJECT UNDER IBRD LOAN

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Background

1. The significance of river training project cannot be emphasized too much. Independently or as part of a larger scale water control program, the small (minor) river[1/] improvement project yields multiple benefits to a national economy. They are; prevention of flood damages to, rural property and life, an expansion of cultivable land and agricultural productivity, facilitation of irrigation and waterway systems, provision of feeder roads alongside the newly constructed river bank, convenience of waterway transportation, and environmental beautification.

2. Thus the river training project has long been a part of human history, as it directly affects human life and activity as a whole. Yet the task of minor river improvements has been often left upon the responsibility of residents, while the government has poured its major efforts on large-scale water resource development. Since 1972 when the Saemaeul Movement inaugurated, the minor river training project has been officially

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1/ Herefrom the term "small or minor river" means branch rivers with the width of river fell between 2-20 meters. In Korea these minor rivers are not legally designated as river.

included in the infrastructure development program as a self-help subproject.

Outline of The Study

3. The evaluation study aims to survey empirical evidence of the socio-economic effects of the minor river improvement project upon rural and national development and help to refine the project's future execution procedures. More specifically, the study attempts: 1) to measure the various benefits of the minor river training project accrued to rural economy with special emphasis on protection of farmland and rural property, increased farm productivity and provision of infrastructural services; 2) to ascertain any occurrance of changes in socio-economic activities of beneficiaries; and 3) to draw recommendations for the project selection and execution procedures in the future.

4. Since no empirical research on the impact of minor river improvement program has been previously made in Korea, this study would hopefully lay a first stepstone for the evaluation methodology of the minor river training project.

Therefore, in the first-year study period, empirical data and parameters of the project performance will have been thoroughly surveyed with an aim to further refine the evaluation methods and to reach the full recovery of the afore-mentioned objectives in the second and third year studies.

5. For the first year study, 40 minor river training subprojects were sampled from 6 counties (Gun), of which 32 subprojects were financed by IBRD either during 1978 to 1979 and the rest were those carried-out as a Saemaeul Movement program during 1973-1977. For each sample survey a county officer responsible for the project and a representative village leader with 5 farmer-beneficiaries were personally interviewed with prepared survey forms. Thus, in total, 40 county officers, 40 village representatives and 200 residents were surveyed as seen in Table 1.

Table 1. Distribution of Sample Subprojects by Category as seen in Table 1

	County	No. of Samples	No. of Surveyed Villages	No. of Surveyed Residents
IBRD Project	Yongin Gun	5	5	25
"	Yeoju Gun	6	6	30
"	Whongseong Gun	6	6	30
"	Eumseong Gun	5	5	25
"	Chunseong Gun	4	4	20
"	Jungweon Gun	6	6	30
	Sub-Total	32	32	160
Non-IBRD	Yongin Gun	2	2	10
"	Yeoju Gun	1	1	5
"	Whoengseong Gun	1	1	5
"	Eumseong Gun	1	1	5
"	Chunseong Gun	2	2	10
"	Jungweon Gun	1	1	5
	Sub-Total	8	8	40
Total		40	40	200

General Description of Minor River Training Project in Korea

6. According to the MOHA/MOC survey data in 1979, it is known that there are 34,958 units of the so-called minor rivers with the width of 2-20 meters running accross the South Korean peninsular. The minor rivers are altogether 39,110 kilometers long, of which 20.6 percent or 8,059 kilometers are yet to be improved in the future. Of the already improved small rivers, 9,180 kilometers have been completed during the years of 1979 through 1972.

7. During 1972 to 1977, a total of 6,480 kilometers of them were completed either by Ministry of Health and Social Affairs for rural employment creation or by ministry of Home Affairs as part of the Saemaul Movement. The other minor rivers of 2,700 kilometers long have been undertaken during 1978-1979 under the IBRD Loan program as shown below.

Table 2. Classification of Minor Rivers in South Korea by Width and Improvement Status

Width (m)	Total Length (km)	Accomplishments (km)			Those Waiting for Improvement (km)
		Non-IBRD (72-77)	IBRD (78-79)	Subtotal	
2- 5	6,755	947	456	1,403	1,652
5-10	10,185	1,379	808	2,187	3,456
10-20	22,170	4,154	1,436	5,590	2,861
Total	39,110 (34,958 Units)	6,480 (22,314 Units)	2,700 (10,189 Units)	9,180 (32,503 Units)	8,059 (2,455 Units)

Source: Data from MOHA, 1979

8. Of the total minor rivers registered (but not officially designated as formal rivers). 17.3 percent of total length are classified as "Saecheon" literally meaning narrow rivers with a 2-5 meter width, 26 percent belong to "Socheon" meaning small minor rivers between 5-10 meters, and the remaining 56.7 percent are "Jungcheon" which has a width between 10-20 meters. As of 1979 Gyeongbuk province comprises the longest inventory of minor rivers in total, that is 19.7

percent of total registered minor river length. The second longest was found in Jeonnam province (15.9%), which is followed by Gangweon province (15.5%) as shown in Annex Table 1.

9. Ministry of Home Affairs suggests that at least 8,059 kilometers more of the minor rivers has to be improved in the foreseeable future with the some attention given to those already completed during 1972-1979. Of the total length of the minor rivers further to be developed, "Saecheon" of a 2-5 meter width comprises 20.5 percent, "Socheon" with a width ranging from 5 to 10 meters accounts for 44 percent, and "Jungcheon" between 10 and 20 meters consists of the remaining 35.5 percent.

Outline of IBRD Project

10. For the period of 1978-1979, the World Bank has financed the 2,700 kilometers minor river training program with 10,189 subprojects over the nation. Originally a total length of 2,500 kilometer was planned for the project. In 1978, a total length of 1,359 kilometers of 6,644 subprojects were completed and the remaining 1,341 kilometers were

implemented in 1979. Contents of the IBRD sponsored minor river improvement project are summarized in Table 3.

Table 3. Summary of IBRD Sponsored Minor River Training Project

Year	No. of Subpro-jects (Units)	Total Length (km)	Construc-tion Cost (1,000 Won)	Beneficiaries			
				No. of Vil-lages	No. of House-holds	No. of Employees	Farm-land (ha)
1978	6,644	1,359	8,695,600	7,277	500,103	3,959,830	22,824
1979	3,545	1,341	11,250,402	3,772	260,754	2,243,331	12,986
Total	10,189	2,700	19,946,002	11,049	760,897	6,203,161	35,810
Per Project Unit:		265	1,958	1.1	74.7	608.8	3.5

Source: Data from MOHA, 1979

11. The IBRD sponsored project as a whole have costed a total amount of 19.95 billion won (cf. planned investment was 18 billion won), of which contral and local governments together with the Bank Loan financed approximately 89.5 percent and the rest were covered by resident-participants. Originally total amount of the investment cost was estimated to about 18 billion

won, of which the Bank would finance 30 percent or 5.4 billion won. Per unit subproject the actual investment cost was averaged as 1,958 thousand won during 1978 to 1979.

12. This minor river improvement component is known to have benefited a total of 760,897 households with 6,203,161 man-day employment and a total of 35,810 hectare farmland in 11,049 villages over the country. Per unit subproject, the benefit was estimated as 74.7 households, 608.8 men-day employment and 3.5 hectar farmland in an average 1.1 villages.

13. The complete breakdown of the IBRD sponsored minor river training project by province is shown in Annex Table 3. The average cost of a unit minor river improvement amounted to 1,360.2 thousand won for 215.9 meters in 1978 and 3,194.2 thousand won for 381.8 meters in 1979. In other words, the 1 meter improvement cost of minor river averaged 6.3 thousand won in 1978 and 8.4 thousand won in 1979, a 33 percent rise during the period.

Execution of IBRD Sponsored Project

14. Most subprojects have been executed during the off-farm season of January-May. City/Gun mayor is primarilly responsible for planning and execution of the IBRD minor river improvement project, under the supervision of Ministry of Home Affairs and Provincial Governer's Office. In principle, Eup/Myon subcounty office directly executes the project in the field but a certain minor rivers which require high level intensive technology in construction may be undertaken by the civilian contractors. Meanwhile, most of minor rivers located in rural and surburban areas are generally contracted for field works with concerned villager-beneficiaries under the direct supervision of relevant office. After the project is completed, the responsibility for maintenance usually rests upon villager-beneficiaries.

15. Criteria in selection for the IBRD projects are set-up by MOHA as follows: 1) those minor rivers located adjacent to various water works already done in frequently flood-stricken areas, 2) those minor rivers whose improvements will certainly result in increased farm production via expanded

land or by use of improved waterways, 3) those minor rivers which will generate considerable wagerincone effects by massive popular participation in the area, and 4) those minor rivers located where village improvement project is undertaken or situated adjacent to tourist destination areas.

16. MOHA also issued directive guidelines in selection and execution of the IBRD sponsored minor river training project. Among others, prospective subprojects are subjective to a simple economic efficiency analysis based on the expected returns from each investment. Each village participating in group contract would be selected out of Saemaeul outstanding villages adjacent to the subproject and those villages which would generate best employment performance. The standard amount of each subproject works would be 300-400 meters with an average budget of 2.5-3.5 million won in 1979. If there were many alternative prospective subprojects in a county/city boundary, priority in execution would follow the order of "Saecheon-Socheon-Jungcheon".

Description of Sample-Surveyed Subprojects

17. As mentioned earlier in (5), eight non-IBRD Saemaeul subprojects and 32 IBRD spronsored subprojects were selected from six counties of three provinces, mostly rural areas (see Map 1-6 in Annex). Originally more of non-IBRD subprojects were planned to survey but found inaccurate record-keeping at the concerned county offices. Sample subprojects and villages were first selected randomly out of the county files and then investigated into their investment records in order to check with the validity of the sample selected. For the conveniency of presentation analysis of the survey results, 32 IBRD sub-projects were integrated into 6 project areas each representing 4-6 subprojects (see Table 4).

Table 4. Characteristics of Sample Minor River Subprojects, 1979

	Code No.	County Province	Project Year	Length (m)	Width (m)	Villages	House Holds	Population	Farmland (Pyong)
Non-IBRD	001	Yongin, Gyeonggi	73	130	8	2	130	650	5,700
	002	Yongin, Gyeonggi	77	480	8	1	61	543	5,000
	003	Yeoju, Gyeonggi	76	250	8	1	55	344	12,000
	004	Whoengseong, Gangweon	75	340	13	1	109	654	18,600
	005	Chunseong, Gangweon	77	280	5	2	73	413	12,000
	006	Eumseong, Chungbuk	75	165	8.5	2	62	325	6,000
	007	Eumseong, Chungbuk	75	380	10	2	46	332	9,000
	008	Jungweon, Chungbuk	77	240	20	1	65	417	4,250
	Subtotal			2,265	80.5	12	601	3,678	71,250
IBRD	009	Yongin, Gyeonggi (Average of 5 subprojects)	78-79	486	9.4	2	147	740	5,540
	010	Yeoju, Gyeonggi(Average of 6 units)	"	326	6	1	62	346	5,667
	011	Wheongseong, Gangweon(Average of 6)	"	250	8.5	1	115	605	12,800
	012	Chunseong, Ganweon (Average of 5)	"	385	36.2	1	100	563	28,680
	013	Eumseong, Chunghuk (Average of 4)	"	213	4.6	1	88	474	6,375
	014	Jungweon, Chunghuk (Average of 6)	"	234	6.3	1	88	560	20,133
Subtotal			"	1,894	71	7	600	3,288	79,195
Averages per Unit				297.1	10.8	1.36	85.8	497.6	10,746

* 1 ha = 3,000 pyong, therefore average farmland benefited rounds about 3.58 hectares.

18. Total 40 subprojects sampled are officially classified as 23 "Saecheon" (2-5 meter width), 10 "Socheon" (5-10m) and 7 "Jungcheon" (10-20m). Noteworthy is the fact that some of the surveyed subprojects were found to have a much wider width of river against the official record by the survey team in the field. This is largely due to the fact that the county office keeps the record of average width of the minor river concerned and that the width has been enlarged owing to the river improvement process. Generally speaking, compared with figures before the project, the length of minor rivers has been shortened but the width been broadened.

19. On the average, a typical subproject has had a length of 297.1 meters with a width of 10.8 meters benefiting 3.56 hectare farmland and 1.36 villages with 85.8 households and a population of 497.6 persons (see Table 4). The above figures are coincidently comparable with the national averages of IBRD projects completed during 1978-1979. Detailed figures of individual subprojects surveyed are shown in Annex Table 4.

Evaluation of Investment and Maintenance Cost

20. For the period of 1972-1979 a total amount of 43.13 billion won has been invested to improve 9,180 kilometers of minor rivers in Korea. Of the total investments, the central government has shared 39.1 percent, local government taken care of 51.1 percent and the rest (9.4 percent) been supplied by local people. The Saemaeul component of 6,480 kilometers completed during 1972-77 had costed 23,185 million won, while the IBRD sponsored project has amounted to 19,945 million won for the 2,700 kilometer improvement. The proportion of local government's share appeared to be larges in the case of IBRD sponsored component: that is 60.6% for IBRD versus 49.7% for non-IBRD. Also, the local people's share in kind or cash has slighly increased for the IBRD case, wheras the proportion of central government's share drastically decreased from 44.1% to 28.9%. Converted all the related cost figures into 1978 prices for comparison, it was found that an average one meter minor-river training cost would be 7.5 thousand won for the non-IBRD subprojects and 6.9 thousand won for the IBRD components. This difference may be explained by the policy changes that the former non-IBRD component emphasized more on

Table 5. Investment Cost for Minor River Improvements in Korea, 1972-'79

Year	Length (km)	Investment Cost (Million Won)				Cost Per Meter (1,000 Won)
		Total	Central Got't	Local Gov't	Local People	
Non-IBRD ('72-'77)	6,480	23,185	10,225	11,524	1,436	3.58
		(48,867)	(20,985)	(23,486)	(4,396)	(1.5)
Ratio		100.0%	44.1%	49.7%	6.2%	
IBRD ('78-'79)	2,700	19,945	5,766	12,092	2,087	7.39
		(18,527)	(5,366)	(11,222)	(1,939)	(6.9)
Ratio		100.0%	28.9%	60.6%	10.5%	
Total	9,180	43,130	15,991	23,616	3,523	4.70
		(67,394)	(26,351)	(34,708)	(6,335)	(7.3)
Ratio		100.0%	39.1%	51.5%	9.4%	

* Figures in parenthes denote relevant values converted on 1978 prices.

the nature of employment-creation program. Thus the government especially at the central level poured a larger amount of money into the non-IBRD project.

21. Valued on 1978 prices, an average sample surveyed subproject has costed 2,205 thousand won or 7.7 thousand won for one meter work. It is also estimated that the average maintenance cost was approximately 180 thousand won for or 600 won per meter. Of these sample figures, IBRD subprojects has required an average investment of 2,167 thousand won or 6.4 thousand won per meter on 1978 prices, while the non-IBRD component costed 2,370 thousand won or 8.6 thousand per meter. The above pdata does not necessarily explain that IBRD subprojects have been roughly executed. On the contrary, the IBRD project seems to have followed the so-called commercial budgeting principle while keeping the strict construction guidelines. It is however noteworthy that the annual maintenance cost of sample subprojects (226 thousand won) was, on the average, much larger than that of the non-IBRD component. This is probably due to the fact that the local government requires a tighter maintenance supervision on the part of IBRD subprojects in order to prepare for audity by superior agencies.

Table 6. Investment and Maintenance Costs of Sample Surveyed Minor-River Training Subprojects (On 1978 prices)

Code	No.	Length (m)	Investment Cost[1]		Maintenance Cost Per Unit[2]
			Amount	Per Meter	
			1,000 Won		
Non-IBRD	001	130	1,092	8.4	88
	002	480	2,691	5.6	110
	003	250	2,789	11.1	110
	004	340	3,428	10.1	242
	005	280	2,164	7.7	198
	006	165	1,172	7.1	110
	007	380	3,076	8.1	132
	008	240	2,548	10.6	176
	Average	283	2,370	8.6	146
IBRD	009	486	2,556	5.3	304
	010	326	1,843	5.7	220
	011	250	2,027	8.1	200
	012	385	2,596	6.7	275
	013	213	1,144	5.4	167
	014	234	1,733	7.4	191
	Average	316	2,167	6.4	226
Average Per Units		297	2,205	7.7	180

1) Actual investment cost was converted into 1978 value using wholesale price index and wage index.
2) Surveyed man-day mobilization of local people for maintenance was valued on 1978 wages.

Benefits of the Project

22. At the outset, the study hypothesized that the river training project would generate various benefits to rural economy. In fact, among others, the project proved to have a considerable effect to prevent water flood damages to existing farmlands and rural dwellings. The flood control effect of a typical subproject on rural economy was estimated as 528,804 won per annum. At the same time, the subproject has resulted in an expansion of farmland with 11 pyong per project which was 21,897 won worth on 1978 prices. Concurrently the average subproject has provided feeder road services along side the bank of improved river. The farm labor and time savings from the feeder road services per subproject were estimated as 31,098 won equivalent per year. Other significant effects which are not counted as direct benefit items in the investment efficiency analysis are: increased farm production due to better waterway facility and a shift in cropping pattern, conveniency in transportation, employment creation effect, and increases in value of land and farm assets. Hardly quantifiable but enormously important effects are environmental beautification and increased security and prestige of local people.

Protection from Flood Damage

23. Ministry of Home Affairs estimated that on the average, farmlands alongside unimproved minor-rivers would be attacked by flood for 1-2 days a year, and that the loss rate of production would be 20 percent of otherwise expected yields. This survey attempted to acquire the first-hand record of actual losses due to flood attacks. It was found that before the project the typical farmland had the flood damages of 1.4 times a year for 2.8 days, and that an average of 1,639 pyong or 15.3 percent of total benefited acreage in the surveyed areas were flooded per annum. At the same time, 5 pyong building area of rural dwellings (houses) were lost for an average 10 year period. Based the actual survey data, the consequent losses in agricultural production and house destructed were estimated as 528,804 won for a typical sub-project area per year (See Table 7)

Table 7. Actual Losses by Frood Attack Before the Project

Code No.		Flooded Area Per Year (Pyong)		Losses in House (Pyong for 10yrs)	Total Amount of Losses (Won)
		Paddy Field	Upland		
Non-IBRD	001	1,500	-	--	582,620
	002	750	-	105	412,624
	003	1,950	-	10	902,130
	004	3,000	-	75	648,456
	005	2,500	550	18	713,380
	006	400	100	15	242,086
	007	350	-	90	370,324
	008	150	1,500	75	429,762
Sub-total	Average	1,325	269	48	537,674
IBRD	009	1,380	980	15	624,222
	010	875	304	45	409,078
	011	2,208	167	30	590,262
	012	2,060	-	-	681,665
	013	1,000	125	10	415,772
	014	1,100	-	8	380,871
Sub-total	Average	1,437	263	18	516,978
Total Average		1,373	266	35	528,804

Expanded Farmland

24. Improving a specturm of minor rivers requires, in many cases, the inclusion of existing land, while it creates new cultivable areas. It is observed that slow sloped minor rivers in general result in new additions to existing farmland. Since most of the surveyed subprojects, were carried out less flood-stricken slow sloped areas, the survey found a net increase of 11 pyong of new farmland per subproject has been augumented after the project, of which paddy land occupies 8 pyong and the remaining 3 pyong for upland. Assuming that one pyong of new added paddy land would produce 85% of the region's average yield (1.6 kl) and the newly cultivated upland would produce the same level of vegetables with the existing one (197 won worth on 1978 prices), the land value converted by the net-return concept would be the ones shown in Table 8. Thus obtained land value of 11 pyong becomes 21,897 which is about a half price of the 1979 market value of existing land.

Table 8. Net Acreage Increases in Farmland After the Project

Code No.	Code No.	Net Acreage (Pyong)		Land Value* (Won)
		Paddy Field	Upland	
Non-IBRD	001	-	-	-
	002	-	-	-
	003	15	-	41,149
	004	50	-	126,024
	005	5	10	1,570
	006	40	10	26,434
	007	-	-	-
	008	-	-	-
IBRD	009	10	-	27,432
	010	12	8	33,582
	011	2	2	4,595
	012	6	4	15,911
	013	1	-	3,058
	014	5	8	13,807
Average		8	3	21,897

* Value of paddy land = $\frac{\text{net returns (income) x 85\%}}{\text{interest rate}}$

$= \frac{\text{Varying region}}{12.5\%}$

Upland value = 197 won per pyong based on NAERI Survey data 1978

Effects of Feeder Road Services

25. The survey results indicate that the minor river training project, without any exception, has provided feeder road services on the newly established bank which is usually connected to existing roads or a new road network at the both ends of the river bank. Previous research on feeder road development done by the author (see Footnot of Table 9) reveals that the project generally accrues to time-savings in traffics, a reduction in agricultural transport cost, farm income increases owing to a shift in cropping pattern, etc. Out of the above benefits, this study has applied only the effect on the agricultural transport savings to the analysis of minor-river feeder road services, because the road services provided by the river bank are relatively short and agriculturally-oriented. The net savings in agricultural transportation cost per one kilometer of feeder road were estimated as 300,540 won on 1977 prices. Applied the above figure after adjusting on 1978 price, agricultural transport cost savings are calculated on the feeder road services of minor rivers concerned as shown in Table 9.

Table 9. Effects of Feeder Road Services in Transportation Cost Savings After the Project.

Code No.		Length of Minor River (m)	Length of Road Services (m)	Savings* in Agr. Transport (Won)
Non-IBRD	001	130	50	21,900
	002	480	150	65,700
	003	250	40	17,520
	004	340	50	21,900
	005	280	30	13,140
	006	165	20	8,760
	007	380	70	30,660
	008	240	100	43,800
IBRD	009	486	100	43,800
	010	326	78	34,164
	011	250	62	27,156
	012	385	126	55,188
	013	213	63	27,594
	014	234	55	24,090
Average		297	71	31,098

* Based on data by S.H. Kim's Evaluation Study on Rural Roads and Bridges Project Under IBRD Loan, KREI, December 1978. Direct Savings in Transportation Cost by road development was 300.5 won per meter in 1977.

Other Effects Associated

26. It is very obvious that the minor-river training project has also affected other benefits of the national economy such as increased agricultural production attributing to a shift in cropping pattern and the improved waterway system, land value increases, employment effects, conveniency in traffic system, environmental beautification and other social benefits. Despite the significance of the above effects, it is quite difficult to seperately differentiate net benefits directly affected by the project alone, if not hardly quantifiable. Therefore, this study treats with those associated benefits as a sort of indirect effects. After the project the net increase in paddy and vegetable growing acreages was found to be respectively 2.1 ha and 0.5 ha per a subproject area (see Table 10). From the above changes alone, an average 10.1 tons of rice and about 300 thousand won worth of vegetables are expected to harvest per annum.

Table 10. Changes in Cropping Patterns After the Project

Code No.		Net Increase in Planting Area (ha)		Total
		Paddy	Vegetables	
Non-IBRD	001	+8	+1	+9
	002	-	-	-
	003	+4	+2	+6
	004	-	-	-
	005	+2	-	+2
	006	+1	+1	+2
	007	-	-	-
	008	+4	-	+4
IBRD	009	+0.9	+0.4	+1.3
	010	+1.5	+1	+2.5
	011	+2.3	+0.4	+2.7
	012	+1.1	+0.3	+1.4
	013	+4.6	+0.1	+4.7
	014	+1	+0.5	+1.5
Total		+29.4	+6.7	+36.1
Average		+2.1	+0.5	+2.6

Table 11. Changes in Land Value After the Project (Won)

Code No.	Project Year	Paddy Land Per Pyong (Medium)	
		Before Project	Present (1979)
001	73	1,500	5,000
002	77	3,000	5,000
003	76	2,500	3,800
004	75	2,000	3,500
005	77	3,000	4,000
006	75	3,000	4,000
007	75	2,500	3,000
008	76	3,500	4,000
009	78 - 78	3,800	4,100
010	"	3,800	4,170
011	"	3,250	3,670
012	"	3,500	3,800
013	"	3,630	3,880
014	"	3,170	3,420
Average	-	3,016	3,953

27. Accordingly, the value of farmland around the project area would increase owing to the aforementioned factors coupled with the trend of general price increase. Taking paddy land of medium productivity in the surveyed areas as an example, the land value per pyong has, on the average, risen from 3,016 won to 3,953 won after the project (see Table 11). The employment-generating effect of the project is also substantial, since the minor river training works are mostly undertaken during the off-farm season from January to May. The survey found that a typical subproject has had provided a total of 648.7 men-days employment during the season.

28. It is also found that before the project the rural villages affected by the surveyed minor rivers used to have traffic difficulties due to flood attacks. On the average in a year, the villagers experienced 3 days with no car traffic and 2 days even impossible to travel on foot towards an outside world when flooded (see Table 12). After the project, little fear for flood damages to properties and human lives and good accessibility to outside worlds have resulted in safety feeling and satisfactory social services among rural resident-beneficiaries. Consequently, local people's attitude has changed.

They have begun to engage in their business more diligently and the prestige of villagers has risen. It is perhaps very reasonable to conclude at this stage that the minor river training project is one of the local people's most urgent and long-wanted programs,

Table 12. Traffic Disconnecting Days Per Annum Before the Project

Code No.		Project Year	Average Annual No Traffic Days	
			Car Traffic	On Foot
Non-IBRD	001	73	4	-
	002	77	2	2
	003	76	2	1
	004	75	3	-
	005	77	5	3
	006	75	3	2
	007	75	10	5
	008	76	-	1
IBRD	009	78 - 79	2	1
	010	"	3	2
	011	"	1	2
	012	"	5	2
	013	"	1	1
	014	"	1	2
Total Average		-	3	2

Economic Viability Analysis

29. Based on the preceding discussion, an economic performance analysis of the minor-river component was attempted as a post-evaluation procedure. Since the analysis is inquiring the economic viability from the viewpoint of national economy and social cost, all the benefits and costs occurred in direct connection of the project execution are conceptually included. However, as mentioned earlier, such direct benefits as reduction of flood damages, net land increase effect, additional road services were taken into account for the economic analysis. Table 13 summarizes those data used for the estimation of economic viable indices such as B/C ratio, NPW and IRR.

Table 13. Summary of Economic Costs and Benefits Per One Meter Minor-River Improvement on 1978 prices

	Length (m)	Costs per m (Won)		Benefits per m from (won)			
		Investment	O&M	Flood Control	Net Land Increase	Road Services	Total
Non-IBRD	283	8,370	520	1,890	90	100	2,080
IBRD Project	315	6,300	720	1,640	55	115	1,810
Average	297	7,420	610	1,780	75	105	1,960

30. All the values employed in this analysis were expressed on 1978 prices and the length of duration of the project was assumed to be ten years. Computation results indicate that the economic rate of returns (ERR or IRR) from a typical minor-river training project was 15%. Discounted all the related values of benefit and cost in comparison at 12%, the average Benefit-Cost ratio appeared to be 1.07 and the net present worth from the project excution was estimated as 198,990 won per subproject or 670 won per meter works (see Table 14). If other associated benefits are included, the results will appear much higher than the above. In any rate, the economic viability analysis evidences that the minor-river training project is very economic and further desirable from the viewpoint of national investment priorties.

Table 14. Economic Viability Analysis of Minor-River Training Project.

	IRR (%)	B/C Ratio	NPW per m (in won)
		Discounted at 12%	
Non-IBRD	15.1	1.09	870 (246,210)
IBRD Project	14.1	1.04	360 (113,400
Average	15.0	1.07	670 (198,990)

* Figures in parentheses denote NPW per subproject on 1978 prices. prices.

31. According to the economic viability analysis, an average non-IBRD subproject shows slightly better performance indices than a typical IBRD-sponsored component. It is very natural to find the difference because all the non-IBRD Saemaeul subprojects had been executed prior to their counter-parts from where the urgency for training and improving the minor-rivers was greater than the latter component. In other words, effects of the Saemaeul minor-river training project were greater. It should be reminded that all the non-IBRD subprojects were completed during the period of 1972-1977, while IBRD subprojects began from 1978.

32. In determining the investment place priority, the degree of flood damage seems to be foremost important. The second important factor may be increased farm productivity cum net land dereage. Thirdly, providing road services poses another reason for planning and executing of the project. However, the above priority criteria could not be used as a rigid project selection procedure until other associated benefits were fully known.

Conclusion: Problems and Recommendations

33. Obviously the minor-river improvement project can be classified as nothing but a marginal resource development, but it is essential to upgrading the quality of rural life. At present the legal responsibility for the management of non-legally designated minor rivers rests upon ministry of Construction. However, Ministry of Agriculture and Fisheries is responsible for the construction and maintenance of large and small-scale agricultural water projects. In the meanwhile, Ministry of Health and Social Affairs is also related to the minor-river development as long as the project aims to generate employment opportunies in slack season. If the project is conducted as a season. If the project is conducted as a sort of Saemaeul Movement, Ministry of Home Affairs will be directly involved. Accordingly, the utilimate responsbility of minor-river management appears to be bewildering and put aside among ministries concerned. It is, therefore, recommended that the final responsible agency be designated for the effective management of non-legal minor rivers.

34. The survey team often noticed that county offices do not keep good records and file of minor river development prior to the IBRD component. In carrying out even IBRD subprojects, hasty and uniform planning/designing of the respective subprojects without sufficient field survey was also observed. When the subproject was contracted with villagers in group, county authority apparently rendered improper supervision and education programs in advance, and thereby causing waste of resources with inadequate construction. It should be also mentioned that the maintenance responsibility be imposed upon local governments. Presently local people are supposed to be in charge of the maintenance, but according to the survey results the actual situation may be decribed as non-existence of post-management. Only three subprojects are found to be properly maintained by local people in close cooperation with county-subcounty authorities. Finally, all the water works, who ever the responsible ministry may be, should be required to include the improvement of minor rivers situated in the project coverage area, if not execution of the works was closely coordinated with the responsible agencies for finalization of the project objectives.

35. In conclusion, the minor-river training project should be continued with the same intensity shown during the process of IBRD project execution. In order to effectively carry-out the project, a special task force composed of by administers, village representatives, contractors and architect-engineer may need to be established at the provincial and county/city level if the program is to reap successful results. The plan should include construction of such related facilities as water-ways, rural roads and bridges and connection with existing rivers as an assembly-line project, regardless of which ministry or agency is responsible for it. Contract system presently being popular in executing IBRD subprojects may need to be shifted toward contracting with professional contractor-firms.

36. It may be needless to point out that this sort of study on minor-river project evaluation has not been previously made in Korea. Therefore, the first year's study faced inevitably with many limitations even in methodology itself. In the second year study, however, new parameters to effectively evaluate the component will be developed by surreying many different types of minor-river subprojects.

빈 면

A P P E N D I X

빈 면

Annex Table 1. Distribution of Non-Legal Minor Rivers in Korea by Province

Province	No. of Minor Rivers	Total Length by Category (m)			
		Jungcheon (10-20 m)	Socheon (5-10 m)	Secheon (2 5 m)	Total
Busan	148 (0.4)	4,070	16,308	96,565	116,943 (0.3)
Gyeonggi	4,452 (12.7)	648,398	1,093,779	2,657,058	4,399,235 (11.2)
Gangweon	3,187 (9.1)	1,287,597	1,700,630	3,068,193	6,056,420 (15.5)
Chungbuk	2,567 (7.3)	611,426	848,049	1,640,042	3,099,517 (7.9)
Chungnam	3,274 (9.4)	772,961	1,013,521	2,265,564	4,052,046 (10.4)
Jeonbuk	3,103 (8.9)	680,907	1,157,869	1,719,237	3,558,013 (9.1)
Jeonnam	6,025 (17.2)	1,009,289	1,172,809	4,024,700	6,206,798 (15.9)
Gyeongbuk	7,144 (20.5)	1,170,311	1,966,958	4,581,099	7,718,368 (19.7)
Gyeongnam	4,970 (14.2)	437,596	1,143,695	2,050,093	3,631,384 (9.3)
Jeju	88 (0.3)	132,203	71,282	67,901	271,386 (0.7)
Total	34,958(100.0)	6,754,758	10,184,900	22,170,452	39,110,110(100.0)

Figures in parentheses denote percentage distribution by province.

Source: MOHA, 1979

Annex Table 2. Investment Status of Minor River Improvement by Pear and Source of Fund

Year	Length (km)	Source of Fund			
		Total	National Expenditure	Provincial Expenditure	Residents' Share
72	788	2,109	-	1,506	603
73	1,354	3,119	1,700	741	678
74	764	3,162	2,000	1,100	62
75	2,432	7,800	4,173	3,627	-
76	579	3,511	219	3,274	18
77	563	3,484	2,133	1,276	75
78	1,359	8,695	2,592	5,183	915
79	1,341	11,250	3,174	6,904	1,172
Total	9,180	43,130	15,991	23,616	3,523

Source: MOHA, 1979.

Annex Table 3. Achivements of IBRD - Sponsored Minor River Improvement, 1978 - 1979

Province	Year	No. of Sub-projects	Total Length (m)	Shares of Cost (1,000 won)			Use of Expenditures (1,000 won)			Beneficiaries			
				Gov'ts Supports	Resi-dents Share	% of the Share	Materials	Wage	Total	No. of Villages	No. of Household	Popula-tion	Farmland (ha)
Gyeonggi	78	867	182,259 (210.2)	955,745 (1,102.4)	109,100 (125.8)	10.2	256,865 (296.3)	807,980 (931.9)	1,064,845 (1,228.2)	918 (1.1)	76,433 (88.2)	411,097 (474.2)	2,328 (2.7)
	79	388	175,313 (451.8)	1,219,947 (3,144.2)	136,243 (351.1)	10.0	433,385 (117.0)	922,805 (2,378.4)	1,356,190 (3,495,4)	426 (1.1)	31,675 (81.6)	289,967 (747.3)	1,416 (3.6)
Gang Weon	78	1,005	172,562 (171.7)	1,039,460 (1,034.3)	128,158 (127.5)	11.0	179,409 (178.5)	988,209 (983.3)	1,167,618 (1,161.8)	1,042 (1.0)	90,967 (90.5)	532,629 (530.0)	7,421 (7.4)
	79	539	177,905 (330.1)	1,336,252 (2,479.1)	183,585 (340.6)	12.1	342,685 (635.8)	1,177,152 (2,184.0)	1,519,837 (2,819.8)	561 (1.0)	40,342 (74.8)	386,629 (717.3)	1,092 (2.0)
Chungbuk	78	430	110,787 (257.6)	620,423 (1,442.8)	73,389 (170.7)	10.6	248,319 (577.5)	445,493 (1,036.0)	69,812 (1,613.5)	468 (1.1)	32,021 (74.5)	255,371 (593.9)	311 (0.7)
	79	270	103,921 (384.9)	779,590 (2,887.4)	88,516 (327.8)	10.2	229,318 (849.3)	638,788 (2,365.9)	868,106 (3,215.2)	292 (1.1)	20,980 (77.7)	198,895 (736.6)	260 (1.0
Chungnam	78	454	128,912 (283.9)	628,560 (1,384.4)	83,499 (183.9)	11.7	135,061 (297.5)	576,998 (1,270.9)	712,059 (1,568,4)	532 (1.2)	41,610 (91.7)	285,077 (627.9)	1,091 (2.4)
	79	292	110,655 (378.9)	816,900 (2,797.6)	95,753 (327.9)	10.5	176,233 (603.5)	736,420 (2,522.0)	912,653 (3,125.5)	300 (1.0)	18,706 (64.1)	254,425 (871.3)	1,555 (5.3)
Jeonbuk	78	842	163,536 (194.2)	965,520 (1,146.7)	112,020 (133.0)	10.4	221,765 (263.4)	855,775 (1,016.3)	1,077,540 (1,279.7)	976 (1.2)	77,163 (91.6)	733,469 (871.1)	1,735 (2.1)
	79	405	158,802 (392.1)	1,275,264 (3,148.8)	142,526 (352.0)	10.1	410,961 (1,014.7)	1,006,829 (2,486.0)	1,417,790 (3,500.7)	447 (1.1)	25,945 (64.1)	311,071 (768.1)	1,217 (3.0)

Province	Year	No. of Sub-projects	Total Length (m)	Shares of Cost (1,000 won)			Use of Expenditures (1,000 won)			Beneficiaries			
				Gov'ts Supports	Resi-dents Share	% of the Share	Materials	Wage	Total	No. of Villages	No. of Household	Polula-tion	Farmland (ha)
Jeonnam	78	784	197,489 (251.9)	1,166,400 (1,487.8)	129,600 (165.3)	10.0	233,329 (284.9)	1,072,671 (1,368.2)	1,296,000 (1,653.1)	968 (1.2)	75,586 (96.4)	592,485 (755.7)	2,215 (2.8)
	79	533	207,451 (389.2)	1,492,992 (2,801.8)	165,888 (311.2)	10.0	364,464 (683.8)	1,294,416 (2,428.5)	1,658,880 (3,112.3)	576 (1.1)	43,749 (82.1)	506,948 (951.1)	2,706 (5.1)
Gyeonbuk	78	1,257	219,477 (174.6)	1,470,946 (1,170.2)	149,026 (118.6)	10.1	350,940 (279.2)	1,120,006 (891.0)	1,470,946 (1,170.2)	1,326 (1.1)	113,298 (90.1)	543,899 (432.7)	3,301 (2.6)
	79	613	226,169 (369.0)	1,750,069 (2,854.9)	196,992 (321.3)	10.1	603,643 (984.7)	1,343,413 (2,191.6)	1,947,061 (3,176.3)	634 (1.0)	47,383 (77.3)	433,173 (706.6)	1,985 (3.2)
Gyeongnam	78	1,005	183,936 (183.0)	1,212,780 (1,206.7)	130,620 (130.0)	10.8	172,881 (172.0)	1,039,899 (1,034.7)	1,212,780 (1,206.7)	1,047 (1.0)	63,065 (62.8)	605,803 (602.8)	4,421 (4.4)
	79	505	181,118 (358.6)	1,407,056 (2,786.2)	162,429 (321.6)	10.3	377,054 (746.6)	1,192,431 (2,362.1)	1,569,885 (3,108.7)	536 (1.1)	31,974 (63.3)	462,223 (915.3)	2,755 (5.5)
Per Sub-project Averages	78		(215.9)	(1,247.0)	(144.4)	(10.6)	(293.7)	(1,066.5)	(1,360.2)	(1.1)	(85.7)	(611.0)	(3.1)
	79		(381,8)	(2,862.4)	(331.7)	(10.4)	(829.4)	(2,364.8)	(3,194.2)	(1.1)	(73.1)	(801.7)	(3.6)

Figures in parentheses denote relevant values per subproject

Source: MOHA Final Report, 1978-79.

Annex Table 4. Characteristics of Sample Surveyed Minor Rivers, 1979

Classification	Characteristics of Subproject					Beneficiaries			
	Location		Project Year	Length (m)	Width (m)	Village	Households	Population	Farm Land (py)
	Name	Subcounty, County Province							
Mon-IBRD	Cheongdeok	Gu Seong, Yongin, Gyeonggi	73	130	8	2	130	650	5,000
"	Namri	Yongin, Yongin, Gyeonggi	77	480	8	1	61	543	50,000
"	Algol	Neungseo, Yeoju, Gyeonggi	76	250	8	1	55	344	12,000
"	Hakgok	Wheongseong, Wheongseong, Gangweon	75	340	13	1	109	654	18,000
"	Wangbawoi	Nammyon, Chunseong Gangweon	77	280	5	2	73	413	12,000
"	Jungsaeng	Saengeuk, Eurnseong, Chungbuk	75	165	85	2	62	325	6,000
"	Yesunteo	Gemwang, Eumseong, Chungbuk	75	380	10	2	46	332	9,000

Classification	Characteristics of Subproject					Beneficiaries		
	Location		Project Yesr	Length (m)	Width (m)	Village	Households	Population	Farm Land (py)
	Name	Subcounty, County Province							
Non-IBRD	Shindae	Sangmo, Jungweon, Chungbuk	77	240	20	1	65	417	4,250
IBRD	Jungseon	Pogok, Yongin, Gyeonggi	78	720	8	1	82	410	5,500
"	Gwankok	Giheung, Yongin, Gyeonggi	78	410	12	2	181	1,060	6,000
"	Gyeongan	Myohyen, Yongin, Gyeonggi	78	340	8	2	150	660	6,900
"	Pundeok	SuJi, Yongin, Gyeonggi	78	440	12	3	210	1,050	3,300
"	Sangsonkok	SuJi, Yongin, Gyeonggi	79	520	7	2	112	520	6,000
"	Sojike	Bukne, Yeoju, Gyeonggi	78	172	2	1	74	431	5,000
"	Cheongan	Jeomdong, Yeoju, Gyeonggi	79	40	20	1	88	485	6,000

Classification	Characteristics of Subproject					Beneficiaries			
	Location		Project Year	Length (m)	Width (m)	Village	Households	Population	Farm Land (py)
	Name	Subcounty, County Province							
IBRD	Jangpung	Daesin, Yeoju, Gyeonggi	78	200	3	1	41	249	8,000
"	Weolsong	Yeoju, Yeoju, Gyeonggi	79	400	2	1	50	224	4,000
"	Yeonra	Yeoju, Yeoju, Gyeonggi	78	300	5	1	43	260	8,000
"	Myontapgol	Neungseo, Yeoju, Gyeonggi	79	480	4	1	78	427	3,000
"	Yangji I	Ucheon, Wheongseong Gangweon	78	300	7	1	104	603	4,800
"	Yangji II	Dune, Wheongseong, Gangweon	78	160	5	1	86	560	5,000
"	Jucheon	Dune, Wheongseong, Gangweon	78	350	15	1	273	1,399	25,000
"	Saemal	Gapcheon, Wheongseong Gangweon	78	183	5	1	64	388	3,500

Classification	Characteristics of Subproject					Beneficiaries			
	Location		Project Year	Length (m)	Width (m)	Village	Households	Population	Farm Land (py)
	Name	Subcounty, County Province							
IBRD	Dong Wha Mok	Gapcheon, Wheong seong, Gangweon	78	360	12	1	99	561	35,000
"	Mae il	Gapcheon, Wheongseong, Gangweon	78	146	7	1	65	119	2,600
"	Dorigae	Nam, Chunseong, Gangweon	79	700	20	2	51	356	33,000
"	Eungdalmol	Seo, Chunseong, Gangweon	79	186	30	1	102	489	21,600
"	Baenamugol	Sindong, Chunseong, Gangweon	79	420	15	2	162	1,052	37,500
"	Sampo	Singdong, Chunseong Gangweon	79	300	50	1	120	608	27,300
"	Gweolgi	Sabuk, Chunseong, Gangweon	79	320	66	1	64	308	24,000
"	Pyengchon	Eumseong, Eumseong, Chungbuk	78	250	4	1	55	312	1,500

Classification	Characteristic of Subproject					Beneficiaris			
	Location		Project Year	Length (m)	Width (m)	Village	Households	Population	Farm Land (py)
	Name	Subcounty, County Province							
IBRD	Teokmitdo range	Soi, Eumseong, Chungbuk	78	200	2.5	1	93	481	3,000
"	Sangchongdo range	Soi, Eumseong, Chungbuk	78	200	9	1	103	586	18,000
"	Dongryek	Soi, Eumseong, Chungbuk	78	200	4	1	100	515	3,000
"	Dwigol	Yangseong, Jungweon, Chungbuk	79	400	8	1	52	259	90,000
"	Gasin	Noeun, Jungweon, Chungbuk	78	100	3	1	60	233	5,000
"	Jangseon	Dongryang, Jungweon, Chungbuk	79	300	20	1	104	521	8,000
"	Suweol	Sini, Jungweon, Chungbuk	78	314	2	1	48	248	3,000
"	Masu	Sini, Jungweon, Chungbuk	78	70	3	1	56	296	4,800
"	Wha seok	Yongweon, Jungweon, Chungbuk	78	220	2	1	205	1,800	10,000

Annex Table 5. Breakdown of Investment Costs of Sample Subprojects by Category of Expenditures, 1979

(Current Prices in won)

Classification	Characteristics of Subproject			Breakdown of Expenditures (Won)						
	Name	Location: Subrounty, County Province	Project Year	Supplies	Technician Fees	Equipment Fees	Supervision	Labor Contribution	Others	Total
Non-IBRD	Cheongdeok	Guseong, Yongin, Gyeonggi	73	194,670	299,727				5,603	500,000
"	Namri	Yongin, Yongin, Gyeonggi	77	515,000	1,444,000		41,000			2,000,000
"	Algol	Neungseo, Yeoju, Gyeonggi	76	756,000	186,000		25,000		1,958,000	2,925,000
"	Hakgok	Wheongseong, Wheongseong, Gangweon	75	745,200	485,000				769,800	2,000,000
"	Wangbawoi	Nammyon, Chunseong, Gangweon	77		489,410		324,090		1,286,500	2,000,000
"	Jungsaeng	Saenggeuk, Eurnseong, Chungbuk	75	772,000	107,000		23,000	271,000		1,173,000
"	Yesunteo	Gemwang, Eumseong, Chungbuk	75	485,000	185,000		30,000	850,000		1,550,000
"	Shindae	Sangmo, Jungweon, Chungbuk	75	720,000	510,000				770,000	2,000,000
IBRD	Jungseon	Dogok, Yongin, Gyeonggi	78	589,000	2,320,175		47,250	330,000	13,575	3,300,000
"	Gwankok	Giheung, Yongin, Gyeonggi	78	910,200	984,000	83,750	22,050	260,000		2,260,000
"	Gyeongan	Myohyen, Yongin, Gyeonggi	78	710,400	990,807	256,000	31,500	250,000	11,293	2,250,000
"	Pundeok	Suji, Yongin, Gyeonggi	78	952,380	1,006,515	19,055	22,050	250,000		2,250,000
"	Sangsonkok	Suji, Yongin, Gyeonggi	79	393,418	2,902,612		190,633	380,000	313,337	3,800,000

Classification	Characteristics of Subproject			Breakdown of Expenditures (Won)						
	Name	Location: Subrounty, County Province	Project Year	Supplies	Technician Fees	Equipment Fees	Supervision	Labor-Contribution	Others	Total
IBRD	Sojike	Bukne, Yeoju, Gyeonggi	78	123,000	151,000		20,000	100,000	706,000	1,100,000
"	Cheongan	Jeomdong, Yeoju, Gyeonggi	79	141,000	330,000		22,000	346,000	2,617,000	3,456,000
"	Jangpung	Daesin, Yeoju, Gyeonggi	78	233,000	180,000		20,000	100,000	567,000	1,100,000
"	Weolsong	Yeoju, Yeoju, Gyeonggi	79	614,000	440,000		22,000	304,000	1,660,000	3,040,000
"	Yeonra	Yeoju, Yeoju, Gyeonggi	78	192,000	133,000		20,000	100,000	655,000	1,100,000
"	Myontapgol	Neungseo, Yeoju, Gyeonggi	79	407,000	319,000		22,000	304,000	1,988,000	3,040,000
"	Yangji I	Ucheon, Wheongseong, Gangweon	78	783,000	582,000			216,000	579,000	2,160,000
"	Yangji II	Dune, Wheongseong, Gangweon	78		670,000			100,000	230,000	1,000,000
"	Jucheon	Dune, Wheongseong, Gangweon	78	717,000	1,491,000			331,000	769,000	3,308,000
"	Saemal	Gapcheon, Wheongseong, Gangweon	78	426,000	283,000			124,000	407,000	1,240,000
"	Dongwhamok	Gapcheon, Wheongseong, Gangweon	78	967,000	667,000			340,000	1,426,000	3,400,000
"	Maeil	Gapcheon, Wheongseong, Gangweon	78	541,000	215,000			106,000	194,000	1,056,000
"	Dorigae	Nam, Chunseong, Gangweon	79	1,833,400	248,944			594,000	2,738,060	5,414,000
"	Eungdalmal	Seo, Chunseong, Gangweon	79		784,200	504,500		202,000	347,000	1,838,000
"	Baenamugol	Sindong, Chunseong, Gangweon	79		1,223,590			403,000	2,033,410	3,660,000

Classification	Characteristics of Subproject			Breakdown of Expenditures (Won)						
	Name	Location: Subrounty, County Province	Project Year	Supplies	Technician Fees	Equipment Fees	Supervision	Labor-Contribution	Others	Total
IBRD	Sampo	Singdong, Chunseong, Gangweon	79		1,008,790	182,726		332,000	1,500,484	3,024,000
"	Gweolgi	Sabuk Chunseong, Gangweon	79		46,100	237,332		270,000	942,128	2,453,000
"	Pyengchon	Eumseong, Eumseong Chunbbuk	78	64,000	270,000			928,000		1,626,000
"	Teokmitdorang	Soi, Eumseong, Chungbuk	78	510,000	262,000			926,000		1,239,000
"	Sangchondorang	Soi, Eumseong, Chungbuk	78	332,000	596,000			488,000		1,416,000
"	Dongryek	Soi, Eumseong, Chungbuk	78	133,000	624,000			482,000		1,239,000
"	Dwijol	Yangseong, Jungweon, Chungbuk	79	227,000	846,000		64,000	303,000	1,584,000	3,024,000
"	Gasin	Noeun, Jungweon, Chungbuk	78	363,000	205,000			108,000	232,000	908,000
""	Jangseon	Dongryang, Jungweon, Chungbuk	79	91,000	83,000		28,000	259,000	2,131,000	2,592,000
"	Suweol	Sini, Jungweon, Chungbuk	78	1,003,000	477,000		36,000	200,000	284,000	2,000,000
"	Masu	Sini, Jungweon, Chungbuk	78	460,000	120,000				420,000	1,000,000
"	Whaseok	Yongweon, Jungweon, Chungbuk	78	980,000	423,000		36,000	200,000	361,000	2,000,000