ECONOMIC AND ECOLOGICAL PROCESSES IN RURAL KOREA: A MACRO-LEVEL ANALYSIS*

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> *Oikos*, the Greek term for "household, home, or place to live," is the root from which economy and ecology derive. Both terms designate *systems of human management*, but where economy refers to the organization of human relations with respect to forms of wealth, ecology designates the pattern of human interactions with the "natural world" (Gudeman & Whitten, Jr. 1982, 223, original emphasis).

Ecological anthropology may be defined as "the study of the relations among the population dynamics, social organization, and culture of human populations and the environments in which they live(Orlove 1980, 235)." In many cases, systems of production constitute important links among them. That is, the view of culture as a basic coping device for the survival of a human population in an environment directed attention to subsistence techniques and strategies as adaptively interacting with social organizations and a whole range of other institutions(Netting 1974, 21). These studies of production can link the approaches of ecological anthropology and economic anthropology. This combination of two approaches moves the focus of research toward adaptive strategies and the integration of individual decisions and community patterns(Barlett 1980a, 545).

Reviewing the development of ecological anthropology, Orlove(1980) called current studies in ecological anthropology "processual ecological anthropology." Important trends are:

> (a)the examination of the relation of demographic variables and production systems, stimulated in part by Boserup's work(1965); (b)the response of populations to environmental stress(Vayda & McCay 1975); (c)the formation and consolidation of adaptive strategies; and (d)new work in Marxism, including the emerging interest of anthropologists in political economy and structural Marxism(Orlove 1980, 245).

These studies examine shifts and changes in individual and group ac-

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tivities, and they focus on the mechanisms by which behavior and external constraints influence each other (McGuire & Netting 1982). These points indicate the importance of the incorporation of decision-making models into ecological anthropology. With the growing modern preoccupation with processes of social change and problems of economic growth, economic anthropology also has an increased concern with processes of choice and decision-making (Firth 1967, 23).

Agricultural development projects may have one or a combination of the following objectives: (a) to increase yields on presently cultivated lands; (b) to bring into production new crops and new varieties; (c) to bring into production new lands for farming through clearing or irrigation; and (d) to adjust land use so as to conserve renewable resources more efficiently(Dasmann et al. 1973, 141). With both changes in new crops and in new technology and production methods, agricultural development implies increased productivity of land units. These changes in agriculture can be studied by looking at these by focusing on adaptive strategies (Barlett 1980a, 549). Many traditional agricultural systems are adaptations to long-term ecological and economic forces. Thus the transition from "traditional" to more "developed" farming practice is a transition to a different framework for decision making, one which may not be adapted to survival in the bad years, but rather to profit maximization in the average years(Barlett 1980b, 5–6).

Any agricultural project causes environmental changes. The relationship between economics and ecology concerns, in effect, the interactions of an economic system and a biological life system, which in this context is the agroecosystem. The ecosystem and decisions made by individual actors affect each other reciprocally.

Another issue in development is the distribution of development costs and benefits between different sectors of society, and between different strata in a farming community. This is in line with a new definition of rural development which is an increased capacity of rural populations to produce, to consume goods and services, to cooperate for communal ends, and to participate in local and national decision-making (Hunter 1969).

In this paper on Korean agricultural development, I focus on the relationship between decisions of family farms as an adaptive strategy and national policy as a development ideology with relation to the examination of demographic variables and production systems. Since development is not a neutral idea but reflects national interest(Schneider 1975, 283), national policy must be included in development studies. In Korea the government has become the most influential external force inducing rural change(Kyong-Dong Kim 1979, 55). It has been often observed in rural Korea that the macro-goals of the government, for example, food-grain self-sufficiency, were in conflict with the individual goals of increased

farm income by an expansion of cash crop production(Dong-Hi Kim 1979, 30). The individual goals may be considered in the actor-based models such as decision-making models in which actors actually allocate scarce resources in order to achieve goals(food production or income). The mechanism of changes at the national level can be seen in the connection between population and resources, linked through systems of agricultural production and the necessity to feed populations. Individual decisions have cumulative consequences which lead to broader change as shown in various national statistics. In this view, individuals and groups responding to perceived environmental circumstances(Benett 1976, 274), elaborate strategies and make choices according to their interests and capabilities.

Analysis of Korean Agricultural Development

The climate of Korea is comparable to that of the north-eastern part of the United States, with heavier rainfall during the months of July and August. The temperatures are mild and pleasant in the spring and fall of each year. The winters are cold and dry but the summers are generally hot and humid. The yearly mean temperature ranges from 10 to 14 degrees Centigrade(50 to 57 degrees Fahrenheit).

Annual precipitation ranges from 30 to more than 50 inches. Rainfall is heaviest during the summer months, with 81 to 93 percent of the total concentrated in the seven months between April and October, when the rainfall is most important for plant growth. The heavy concentration of rainfall in summer months, however, frequently results in disastrous floods. Furthermore, there is considerable fluctuation in the precipitation from year to year and heavy losses from droughts have been experienced by various sections of the country.

The soil of Korea is generally deficient in plant nutrients and organic matter. The top soil is relatively thin and poor and the crop yield tends to be small. Korean farms generally require substantial treatment of organic or chemical fertilizers to produce adequate crops. The arable land in Korea is not more than 22 percent of the total area of the country. The greater part of the soil is derived from granite and gneiss and is largely sandy with only 12.5 to 37.5 percent of clay. In general, the soil of the southern coast is red, while that over the greater part of the country is brown. Korea has only limited areas of dark clay soils, which are usually classified as fertile, in the northern provinces of Kangwon and Kyunggi (MAF 1965, 1–2).

Relationship between Population and Land

The two prime inputs of traditional agriculture are land and labor. The level of agricultural production in traditional agriculture is limited by the amount and quality of land and by the amount of labor provided by

the farmer, directly for production, or indirectly through the formation of capital goods. If a farmer employs more land in traditional agriculture, it is either land already in cultivation which is transferred from one farm to another, with little if any effect on aggregate production, or new land brought into cultivation through land clearing or reclamation. Thus, enlargement of the aggregate cultivated area depends upon farmers' decisions to allocate labor for this purpose(Mellor 1967, 37–38).

The land institutions which relate to agricultural development may be classified into four categories: land resource developments and improvements; the land tenure system; the farmland protection systems; and the land inheritance system(Dong-Hi Kim 1979, 25).

Increases in the acreage under cultivation have not played a significant role in the rise in farm output during the past three decades in Korea. Expansion of the acreage under cultivation has been stated to be a major objective in each of Korea's first three five-year plans (1962–1976) and toward the end of the third plan, Korea's total cultivated acreage was only 10 percent above that of 1960(see Table 1). The Korean pattern, therefore, is much like that of the rest of East Asia(Ban et al. 1980, 80). Centries of slow but substantial population growth filled up the empty spaces until there was little room for further expansion. As the farm population continued to grow, an effort was made to move up the hillsides and to reclaim tidal lands, but mainly farms got smaller and smaller. The accelerated pace of industrialization and urbanization in the 1960s further exacerbated the problem by removing more and more good land from agricultural uses.

TABLE 1 CULTIVATED ACREAGE, 1952–1975

(1,000 hectares)

Year	Total	Paddy	Upland
1952	1,942.5	1,153.4	789.1
1957	1,998.8	1,192.9	805.9
1962	2,062.7	1,223.1	839.6
1967	2,311.9	1,290.5	1,021.4
1972	2,242.3	1,259.4	982.8
1975	2,239.7	1,276.6	963.1

Source: MAF, Agricultural Development Corporation, *Yearbook of Land and Water Development Statistics 1975.*

Since large tideland development projects were particularly expensive, many land reclamation efforts depended so heavily on subsidies. One project initiated in 1963 involved investment of 520 Won per P'yong (approximately 1/3,000 of a hectare) when existing paddy land in that region was selling for only 250–300 Won per P'yong. Upland development was more economical. Investment costs in the 1960s on these fields were

only 24 to 28 Won(only 9 Won if farmer labor is excluded) against an average price of upland at that time of about 100 Won per P'yong(Ban et al. 1980, 83–84). When the subsides ended, all tideland and upland development fell off so sharply. In part the answer is that some of the farmers who owned forest land already farmed as much land (about 2 hectares) as their family labor could handle. To cultivate more land they had to hire labor from outside, and hiring labor for upland was economical only if the new land was planted to cash crops. Changes in farm size distribution and average size of household are shown in Table 2.

TABLE 2 CHANGES IN FARM SIZE DISTRIBUTION AND AVERAGE SIZE OF HOUSEHOLD

	Farm Size						Total
	under 0.3	0.3~0.5	0.5~1.0	1.0~2.0	2.0~3.0	3.0ha+	
Percent of all farm households							
1960(%)	16.2	18.7	36.0	24.2	4.1	0.8	100.0
1970(%)	15.3	16.6	34.6	26.8	5.1	1.6	100.0
Percent of farm land							
1960(%)	4.0	9.0	31.6	39.9	10.7	3.8	100.0
1970(%)	3.3	7.3	27.9	40.6	13.6	7.3	100.0
Average size of household							
1960(persons)	4.9	5.3	6.1	7.2	8.3	8.8	6.1
1970(persons)	4.8	5.2	5.8	6.6	7.1	7.4	5.8

Source: Based on agricultural census data for 1960 and 1970. After Ban et al. (1980, 360–361) with modifications.

Land tenure rules can create differences in carrying capacity in the face of identical habitats and technology particularly, because such rules affect the geographical distribution of individual landholdings (Hardesty 1977, 205). Traditionally, the ownership of land has been sought as an important goal for the security of family life in Korea. Also a partible land inheritance system has prevailed for a long time. A Korean farm is generally composed of many small plots scattered around near a village. Even though the tenant-farmed land has lower productivity than the owner-farmed land because tenants are reluctant to invest in leased land (Kim et al. 1980, 24), the tenancy system does not have the significance of an exploitative economic relationship insofar as cultivated land is concerned(Man-Gap Lee 1973). This, Lee explains, is mainly due to the fact that many of the landowners are either relatives or acquaintances of the tenant farmers. Change of tenant-owner distribution (Table 3) may be one indicator as an increase of carrying capacity. The direct impact of Korea's land reform efforts in the 1945–1952 on agricultural productivity, however, was probably neither strongly positive nor strongly negative. The main impact of land reform lay instead in the area of income redistribution(Ban et al. 1980, 297). That is, land reform improved the

TABLE 3 OWNER-TENANT DISTRIBUTION OF FARM HOUSEHOLDS, 1945–1977

	1945	1965	1975	1977
Full owner	13.8	69.5	72.2	63.9
Owner-tenant	16.4	15.5	13.0	20.1
Tenant-owner	18.2	8.0	6.5	9.4
Tenant	48.9	7.0	8.2	6.6
Farm labor and burnt field farmers	2.7	—	—	—
Total	100.0	100.0	99.9	100.0

After Ban et al. (1980, 286) & Kim et al. (1980, 24).

equity position of tenant farmers with small holdings and transformed the social structure toward a more unimodal nature(Dong-Hi Kim 1979, 25).

In reviewing the production responses open to rural communities in the developing world, Grigg(1980, 271) argued that it is likely that multiple cropping is a function of population pressure; there is some correlation between population density and the index of multiple cropping, and the growth of population has often been a cause of a rise in the index. The double-cropping index in 1975 was, however, no higher than it was in the early 1960s in Korea. A resort to increasing levels of double-cropping has been no solution to the lack of land(Ban et al. 1980, 87).

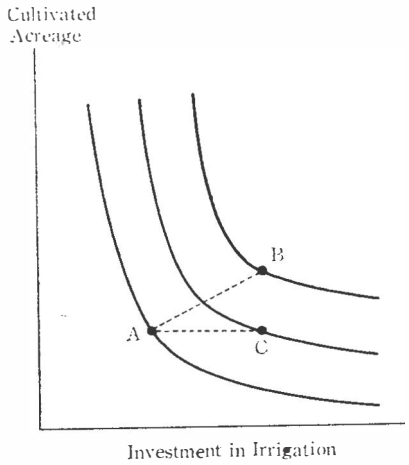
Intensification in Agriculture and Stratification

When population density exceeds a certain level in a region, the better land is cropped once every year or more with the use of labor-intensive techniques of fertilization and, if necessary, irrigation. This is the method usually applied in Asia. Intensification of this Asian type not only increases the area that can be cropped in a given year. It may also raise yields per crop hectare, particularly in the cases where a transition from dry to irrigated agriculture is involved. However, these higher yields per crop hectare are obtained by a much higher labour input per crop hectare, even in the cases where the water for irrigation is supplied from canals built and operated by others than the peasant himself. Harvest work per crop hectare is roughly proportionate to yields, and irrigated crops must often be weeded by hand and sometimes transplanted. Total labour input per crop hectare of a given crop may be twice as high as for dry cultivation even where watering is by gravitation and requires very little labour (Boserup 1965, 39). Boserup(1965, 61) explained the agriculture of Japan in the period from about 1600 to about 1850 as an example of rising population and gradual change to more intensive systems of land use. From a certain point, the increase of population seems to have caused a reduction of the average size of agricultural holdings and a thorough change of

methods.

To grow crops one must have land and water; either alone is obviously insufficient. For many crops, timely rainfall is an adequate source of water, but rice paddies require large amounts of water at just the right time. Irrigation systems, therefore, play a key role. This essential relationship is illustrated by Figure 1. If land is fixed, investment in irrigation will move along a line from A to C. By the time C has been reached, the return on further investment in irrigation will have fallen to zero. If the cultivated acreage is expanding together with continued investment in irrigation (movement from A to B), in contrast, the return to these inputs jointly will remain high. Korea, like the rest of East Asia, is moving along a line more like A to C than A to B (Ban et al. 1980, 93–94). Cultivated land is nearly fixed and has been so for a long time, while investment in irrigation has been proceeding for a long time (see Table 4). Improved control over the supply of water has not only raised yields in good years; it also appears to have reduced some of the fluctuation in farm output from year to year.

FIGURE 1 DIAGRAM OF LAND AND WATER AS COMPLEMENTARY INPUTS



After Ban et al. (1980, 93).

Compared to traditional agriculture, modern agricultural production is importantly affected by allocations of working capital such as fertilizer,

TABLE 4 THE EXPANSION OF IRRIGATION OF PADDY FIELDS

(1,000 hectares)

	Total paddy acreage	Irrigated		Non-irrigated	
		Benefited by irrigation association	Completely irrigated area	Partially irrigated	Rain field
1952	1,226.3	183.7	351.3	278.8	412.6
1956	1,093.2	197.8	340.8	279.4	275.2
1960	1,202.9	236.4	392.7	285.5	288.3
1965	1,198.9	281.2	421.1	198.7	197.9
1970	1,183.5	304.1	534.7	223.2	112.6
1974	1,268.9	309.1	583.5	288.6	87.8

Source: MAF, *Yearbook of Agriculture and Forestry Statistics*, 1952, 1961, 1976.

pesticides, and mechanical power(Mellor 1967, 38). In Korean agriculture, the two current inputs of greatest importance have been improved plant varieties(seeds) and chemical fertilizers. Improved plant varieties and fertilizer are basically complementary inputs; that is, without large increases in the availability of chemical fertilizer, little of the potential rise in productivity from the new varieties could be realized. Similarly, without the introduction of new varieties, the increased application of chemical fertilizer would face sharply dimishing returns(Ban et al. 1980, 99). The introduction of the *t'ongil* and *yusin* varieties of rice in the 1970s in Korea was a continuation of a process begun long before. The *t'ongil* and *yusin* varieties, however, differed from earlier varieties not so much in their potential impact on productivity (they made possible a 30 percent rise in yields) as in their origin. These newest rice seeds were based on varieties developed originally for tropical areas at the International Rice Research Institute in the Philippines. The emergence of pests and diseases following the introduction of new crops or more productive varieties is a natural ecological consequence of their cultivation and one of the major preoccupation of modern agriculture. In general, most of the environmental damage and ecological complications produced indirectly by economic stimuli occur when benefits to the producer are very high (Dasmann et al. 1973, 149). In addition, because of their very success high-yield varieties present a rich and attractive source of food for insects and other animals.

The ecological problems with the introduction of high-yield varieties(HYV) also results from the interaction of national policies and individuals' decisions. The national goal of agricultural development is subsistence at the national level. After 1945 Korea became a net importer of grain; during 1971–1975, annual average of imports of rice was 536 (1,000 M/T). As a consequence, planting of high-yield varieties has been compulsory. These are, however, more susceptible to natural hazards such as floods and droughts, and diseases. Moreover, the market price of rice of traditional varieties is higher than that of HYV rice, because of the food habits of a community. To choose and make use of available food means that food habits have an ecological component (den Hartog & Bornstein-Johansson 1976, 101). Individual farmers make efforts to seek out the balance of planting between traditional varieties and HYV. Traditional varieties secure their income and subsistence; HYV guarantees an increase in total productivity. As a response to natural hazards some farmers want to plant HYV after HYV are affected by them. This is explained as follows: Since natural hazards do not come each year, farmers are going to compensate for losses of the previous year with high productivity the next year. HYV requires not only more fertilizers but also more pesticides than traditional varieties. Since increase of pesticides affects human health, many farmers recently tend to hire labor when spraying pesticides. Any de-

velopment activity results in suffering for some of the subject group (Schneider 1975, 289), that is, as in the case of wage laborers in spraying pesticides.

The most immediate effect of the forced adoption of HYV cultivation has been to increase the existing concentration of wealth and land, furthering the already great economic inequality of the rural areas (see Cummings 1978). As a consequence of the higher productivity of HYV, the differences of incomes among the strata divided by the acreage of cultivated land have been widened(see Table 5). Another reason for these income differentials between sizes of land holdings is the government policies which benefit large farmers more than small farmers(Yang-Boo Choi 1979, 300). And also, large farmers are better able to exploit government policies (Barlett 1980a, 556).

There is another situation between national policies and individuals' decisions in relation to ecological problems during intensification in agriculture. As shown in Table 6, farmers have been reluctant to use phosphates and potash at any price. Stories are even heard of farmers throwing away potash in order to use the bags. It is unclear why farmers have responded with such a lack of enthusiasm for potash, but it may

TABLE 5 Farm Household Income and Agricultural Income by Size of Land Holding, 1962–1977

(1,000 Won)

Classification	Farm household income		Agricultural income	
	Amount	Index*	Amount	Index*
National average				
1962	67.9	100	54.0	100
1965	112.2	165	88.8	164
1971	356.4	525	291.9	541
1977	1,432.8	2,110	1,036.1	1,919
Under 0.5 ha				
1962	42.5	100	26.1	100
1965	71.7	169	42.0	161
1971	210.5	495	118.7	455
1977	872.4	2,053	364.6	1,397
1.0–1.5 ha				
1962	78.5	100	67.4	100
1965	130.9	167	110.1	163
1971	417.1	531	370.8	550
1977	1,651.6	2,104	1,318.7	1,957
2.0 ha & over				
1962	132.8	100	119.9	100
1965	218.2	164	195.5	163
1971	682.9	514	618.2	516
1977	2,993.4	2,254	2,560.5	2,136

* 1961 = 100.

After Yang-Boo Choi (1979, 279) with modifications.

TABLE 6 FERTILIZER CONSUMPTION—INTERNATIONAL COMPARISONS, 1972

(kg. per hectare of arable land)

	N	P	K
Japan	138	135	113
United States	40	24	21
Mexico	19	6	1
India	11	4	2
Korea(1972)	166	76	46
(1975)	215	106	75

After Ban et al. (1980, 106).

because the correlation between use and yield is less obvious and less immediate than in the case of nitrogen(Ban et al. 1980, 109). The government has attempted to counter these tendencies by selling fertilizers in compound or mixed form, a measure that involves a degree of coercion.

Population Dynamics and Change of Agricultural System

Geertz(1963) describes how the two types of ecosystems in Indonesia, swidden agricultural ecosystem (shifting cultivation) and *sawah* or wet rice agricultural ecosystem were broken up as a result of external interference. It seems that three main forces have deteriorating effects on a balanced ecosystem and the food habits of the community. These are (1) population growth, (2) orientation away from subsistence towards cash crop farming, and (3) urbanization. These forces are similar to those affecting change of agricultural system in Korea except for population growth. Rather, population dynamics between rural and urban sectors are important to explain this change. In relation to agricultural development and migration, other things being constant (i.e., no improvement in the urban sector), an improvement in the agricultural sector should lead to significantly less rural out-migration. But the crux of the matter is that other things were not constant in Korea and that successful rural development in Korea has not resulted in slowing rural-to-urban migration. The reason is that the "pull" of the urban sector seems to dominate as a determinant of rural-to-urban migration in Korea (Glosse 1981).

As shown in Table 7, rural-to-urban migration affects the labour in agriculture. Since most migrants are youths and adults in the prime of life, oldsters, women, and children participate more in agricultural work. Another response to a real shortage in the peak seasons(mainly June, July, and October) is mechanization. Since there was an upper limit of 3 hectares on the size of farm up to last year, mechanization is not a special requirements of a few wealthy landowners. Korea, from the 1950s on, appears to have been going through a fairly typical (for Asia) pattern of farm mechanization. The first stage usually involves the mechanization of grain processing. The second stage of farm mechanization

TABLE 7 FARM HOUSEHOLD AND FARM HOUSEHOLD POPULATION

	Total household (A)	Farm household (B)	B/A	Total population (A)	Farm population (B)	B/A	Average number of farm households
	———1,000———		%	———1,000———		%	(persons)
1966	5,191.5	2,540.2	48.9	29,160	15,781	54.1	6.21
1970	5,856.9	2,483.3	42.4	31,435	14,422	45.9	5.81
1975	6,757.2	2,379.0	35.2	34,681	13,244	38.2	5.57
1980	7,967.6	2,158.4	27.1	37,449	10,830	28.9	5.02

Source: MAF, *Yearbook of Agriculture and Foresty Statistics*, 1981.

involves the use of power equipment to substitute for human labor in key peak-season activities. A third stage, the introduction of hand and larger tractors, only began in earnest in Korea in the 1970s (Ban et al. 1980, 74–76).

Mass migration connected with industrialization will increase the demand for food. The changing composition of agricultural output (Table 8) is undoubtedly in response to change in consumer demand as rising incomes become manifested in greater consumption of vegetables, fruits, and other crops. This change has induced farmers to increase their production of the higher profit crops and to adopt new cultivation techniques, such as hothouse vegetable production, which has sprung up around all the major cities (Cole & Lyman 1971, 143). Works in hothouses causes farmer's diseases and the expansion of greenhouses causes the pollution with polyethylene vinyls in rural areas.

TABLE 8 PERCENTAGE COMPOSITION OF AGRICULTURAL PRODUCTION BY COMMODITY GROUPS, 1955–1974

(current price)

Commodities	Year			
	1955–1957	1962–1964	1969–1971	1972–1974
All crops	87.5	90.0	83.5	82.5
Food grains	71.3	77.1	61.8	59.9
Monopoly crops	1.5	1.8	2.5	4.2
Fruits	1.8	1.8	3.0	3.3
Vegetables	9.4	7.2	13.8	9.7
Special crops	2.4	0.9	1.4	1.7
Crop by-products	1.1	1.2	1.1	3.7
Livestock & its products	11.8	9.5	14.9	15.1
Livestock	10.0	7.6	11.0	11.3
Livestock products	1.8	2.0	4.0	3.7
Cocoon	0.6	0.4	1.4	2.5
Nursery stock	0.1	0.2	0.1	—
Total	100.0	100.0	100.0	100.0

After Ban et al. (1980, 50).

As the Korean economy develops, the need of farmers for cash to purchase goods and services for household consumption and for farm production tends to increase. In order to earn more cash income the crop farms have to sell more crops on the market. The increasing commercialization of the semisubsistence farms is an important factor in increasing production with a limited land area. With a given amount of land, the farmer who sold a larger proportion of his total product produced a larger output per unit of land and labor than the farmer who sold less. Hence we can say that the increasing commercialization is positively associated with the growth of the agricultural economy(Park 1969, 206). Increasing agricultural production has been a key growth factor for the Korean economy, even though the increase of exports of goods is most important in 1970s. Korean rural development is a story of farmers making the best use of their resource endowment by putting greater emphasis on the cash crops.

National Policies and Risk

To study the relationships between family farms as domestic groups and their energy sources, ecologists and ecology-oriented researchers have begun to use a number of "risk" models. These are useful because they take the perspective of the peasant as a decision-maker faced with a set of environmental conditions, a specific technology, and a limited labor force(Greenwood 1973, 44–45). That is, agricultural decisions are inherently complex involving environmental appraisal, knowledge of techniques, experience with crops, and the fund of capital, labor, and land mustered by the cultivator(Netting 1974, 44). The most significant step yet to be taken in agrarian ecology is the reuniting and effective cooperation of cognitive and operational approaches (Rappaport 1979) to the subject. The range of agricultural options open to farmers is usually determined by the interaction of the natural environment with the larger social environment(Barlett 1980b, 9). The national policies are an important part of this social environment.

The attitude of the Korean government toward agriculture has changed radically over time:

> Throughout the 1950s and much of the 1960s the government withheld any major move to stimulate agricultural production in order to curb inflation. However, in the 1970s the government came to use grain prices as a means of improving agriculture's terms of trade in order to raise farm incomes and encourage increased production in spite of the significant increase in inflationary pressure(Moon 1979, 164).

This high-rice-policy and the government purchase of rice encouraged farmers to work harder and to participate in rural development activities (Whang 1980a, 189). Policies can be subdivided into two classes on the

TABLE 9 POLICY ALTERNATIVES TO DEAL WITH UNDESIRABLE CONSEQUENCES OF RISK AVERSION

A. Policies specific to agricultural risk
A-1 Crop/credit insurance, loan guarantees, etc.
A-2 Relief and famine policies
A-3 Pure buffer stock or price stabilization schemes
A-4 Plant protection by groups of farmers
A-5 Flood protection
A-6 Breeding for crop yield stability
B. Policies which are not risk specific
B-1 Subsidization of inputs and/or credit
B-2 Agricultural price support as income policy
B-3 Allocation of investment and research resources to regions
B-4 Reduction in background risk
— irrigation investments
— increased efficiency of markets(roads, market information)
— improved access to information about technologies (extension, demonstration, etc.)
— improved nonagricultural job opportunities
— improved medical and other welfare policies
B-5 Legislation, regulation, institutional reform in areas such as credit and land tenancy
B-6 Land reforms and other income/wealth distributions

After Binswanger(1979, 394).

basis of whether agricultural risk reduction or risk spreading is the primary goal of a policy(see Table 9):

> A policy is classified as risk specific if it reaches its ultimate efficiency or equity goals primarily via the effect which its risk spreading or reducing impact has on farmer's behavior towards the choice among risky production processes. A policy is classified as nonrisk specific if its main effect on efficiency or equity is not reached primarily as a consequence of risk spreading or reducing (Binswanger 1979, 393).

One risk specific policy is the introduction of new varieties into entire areas rather than leaving adoption up to individual farmers. Introducing varieties of different levels of maturity on a few farms often increases the risk of pests and birds for the newly introduced or the traditional varieties, or both. Areawise, introduction of varieties spreads and minimizes these risks(Binswanger 1979, 395). However, the individual's decision of the amount of new varieties to be planted is made in consideration of other factors such as susceptibility to natural hazards and the needs and/or goals of the household.

Another government policy of rural development was achieved in the *Saemaul Undong* (New Community Movement) in the 1970s. *Saemaul Undong* has made an enormous impact upon villages in Korea, at three

levels:

(a) Changes in values and perceptions of rural farmers toward developmental values;
(b) Modes of village organization and development of community-based leadership; and
(c) Improvements in rural infrastructures and village economies (Whang 1980b, 22–32).

These impacts became a part of the social environment in which farmers make agricultural decisions with uncertainty and risk.

Conclusion

Korean agricultural development in the past has involved the intensification in agriculture and commercialization with cash crops, which results in an increase of productivity and individual income. Most national policies coincide with individuals' interests. In the case of irrigation investment, both the increased production levels and the risk reduction will benefit the same target groups of farmers or regions and no goal conflict arises. Therefore, rates of returns to all irrigation investments would be higher than those measured by an increase in expected output (Binswanger 1979, 397). However, there is a human ecological problem which is not necessarily solved by commercializing subsistence farming and obviously cannot be diagnosed only in terms of commodity production, income or price statistics. For example, increase of farmers' diseases is not identified even by themselves. Even though both national demand and individual's interest lie with productivity and income as a consequence which result in a particular cropping pattern, the human population as one component of the ecosystem must not be badly affected.

With the agricultural development and industrialization in Korea, the most striking phenomena are the level of rural-to-urban migrations, social and economic inequalities between rural and urban areas, and the increase of income differentials between the strata divided by the acreage of cultivated land. These are related to the role of agriculture. If the role-of-agriculture is desirable for economic growth, then the more basic question becomes: For whom and why economic growth is desirable? In other words, how will this role-of-agriculture contribute to the welfare of people, including rural and farm people(Choi 1981)?

We do not presently know whether nations in general have produced viable or poor overall ecological adaptations to their respective environments and whether nations use their resources rationally. These would be well worth knowing for development policy purposes. We cannot specify the conditions in which to expect a viable adaptation to exist nor those where failure is to be expected(Greenwood 1973, 47–48). However, the ecological framework can explain, elaborate, and integrate impact

research findings and analyses. The starting point is the conceptualization of impact events as consisting of the effects resulting from the adaptation of individuals and populations to environmental alterations(Murdock 1979, 559).

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