

THE STATE AND IRRIGATION REFORM IN SOUTH KOREA*

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Abstract

The South Korean irrigation reform of 1979 is an attempt to arrest certain trends in the financial allocations of Farmland Improvement Associations, which the government regards as harmful for the productivity of irrigated agriculture. The method is to restructure the decision-making environment of canal managers in such a way that they have a *monetary* incentive to decide on a more productive use of resources, against the short-term interests of FLIA members. Study of the response of FLIA staff to the new measures over the next several years offers an opportunity for an exploration of how the central government attempts to control local parastatal agencies, and of the reactions of their staff to those attempts. Such a study also allows an exploration of the comparison with irrigation reform in Taiwan, and in particular, of the extent to which the differences in reform trajectory are due to differences in the value of irrigation water between the two countries, or to differences in politics.

The government of South Korea is embarking upon an important reform in the management of canal irrigation projects. My purpose in this paper is to describe what the reform consists of, and show why it deserves the attention of scholars concerned with administrative aspects of agricultural development, and indeed, of those concerned with questions of public administration and policy implementation more generally.

South Korea's canal systems are managed (in the case of those with an irrigated area of over 50 hectares) by parastatal bodies called Farmland Improvement Associations (FLIAs).¹ In the past, each water source had one FLIA; now, smaller systems have been grouped to-

* This paper is based on eleven weeks of fieldwork in South Korea over the summer of 1979, concentrating on administrative aspects of canal irrigation. The research follows on the same theme in India, whence come the comparisons drawn in the paper. I am grateful to the Korea Rural Economics Institute and its staff for providing a base for the research. And to the staff of the FLIA which I have called SY FLIA, for their extraordinary patience in answering my questions. And finally, to my assistant, Su Young Chan, for patience, good cheer and insight.

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¹ For an account of operational problems of smaller systems, see Oh (1978).

gether with the aim of having approximately one FLIA per county.² This type of decentralized organization contrasts with that found in most of South and Southeast Asia, where a state Irrigation Department is responsible not only for the construction but also the operation of canal systems; and is similar to that found in Japan and Taiwan (Abel 1975).

One of the main problems of the decentralized, semiautonomous form of organization is a tendency for the management, being closely identified with and involved with the local population, to underspend on maintenance—and thereby save costs which would have to be met from water charges; to take on excessive numbers of staff, and pass the costs on to irrigators; and to save too little out of current revenue, and rely on the government to finance shortfalls. The government can guard against these tendencies by strict supervision and control; but this partly vitiates the advantages of the decentralized form. Or it can attempt to structure the decision-making environment of the canal managers in such a way that they have an incentive to decide on a pattern of financial allocation which does not produce the above tendencies. The irrigation reform in South Korea, which is due to be implemented for the first time in the 1980 agricultural year, is an attempt to move in the latter direction. Before going on to describe it in detail, I want to say more about why the study of its effects would be of wide interest.

The Compliance Problem in a Mixed Economy

In an economy which is “mixed” in terms of the distribution of ownership and the distribution of decision-making power, the critical point in the implementation hierarchy is the gap between the government apparatus and the private sector. However rigorous and consistent the abstractions of the planners, their effectiveness depends on how this gap is crossed. The same point applies to relations between government and semi-autonomous public enterprises, though the kinds of instruments available to government for crossing the gap will in this case be somewhat different from those available for the private sector.

Our knowledge of how South Korean public administration actually works (as distinct from the principles), and specifically of how this gap is crossed, is woefully inadequate.³ We know that the government has been actively and pervasively interventionist, and we can take it as likely (though the proposition is debatable) that its interventions have been an important part of the explanation of South Korea’s rapid economic growth. We know too that these interventions have ranged from non-

² In 1976 South Korea comprised nine provinces, 33 cities, 139 unities; average county population was just over 100,000.

³ One useful study is Aqua (1974).

discretionary manipulation of the environment in which enterprises make decisions, to direct command and administrative discretion. But there are very few detailed case studies which would illustrate the processes by which the compliance of enterprises with government policies is obtained.

One important set of intervention instruments attempts to secure compliance by changing the structure of rewards open to enterprises: compliance or non-compliance is then up to each enterprise, and compliance carries its own reward. In a sense, many instruments of macro-economic policy operate in this way, as in the use of high interest rates, for example, to discourage adoption of capital-intensive technology. However, the set of instruments to which I drew attention is more specific. It consists of measures to announce desirable goals pertaining to a specified set of enterprises, and allocate special rewards to all those enterprises which reach the given goals, or to a given number of enterprises who do best in relation to the goals.

One example is the use of Government-awarded prizes to promote exports (Jones and Sakong 1978, Ch. IV, p.25) On "Export Day," November 30th, the highest ranking exporters are with great fanfare awarded "industrial merit-medals" of gold, silver and bronze pagoda rank. In addition, special awards are given to those exporting over US \$100 million worth of goods. The prizes are awarded by the President personally, and are much coveted.

Again, prizes have been used to prompt irrigators to pay their water charges. When the budget of an organization depends on payments from its clients, one can expect that the question of how to ensure that the clients pay their dues would greatly exercise the imagination of the organization's staff; their own welfare is at stake. In South Korea, each FLIA organizes elaborate competitions between villages in its jurisdiction, such that the first three villages to pay all their water charges receive a substantial monetary prize; moreover, the competition is not between all villages within a FLIA's area (in big FLIAs, with an irrigated area of say, 1,000 hectares or more, that would involve too many villages for the competition to have a sharp effect on willingness to pay), but between villages in each of quite small sub-divisions, which may each have only 10-20 villages. There are even prizes for the field stations of the FLIA which get all the water charges in their area paid up first, second and third. Another competition awards prizes to the field staff who make the most non-chemical fertilizer. The government has been worried by the fall-off in the use of natural fertilizer, and has thus ordered the FLIAs to introduce the non-chemical fertilizer competition in the hope that the sight of the field station staff energetically making compost would have a desirable demonstration effect on farmers.

One sees the same principle of intervention at work in the *Saemaul* (New Community) Movement, the community development programme launched in 1970 (Brandt and Lec 1977) Villages which used the initial allocation of cement well were given more cement plus steel rods the following year, to promote a spirit of constructive competition in which less successful villages would strive to follow these that got more help. In 1973 a national *Saemaul* convention was attended by some 4,000 people selected for their villages' superior achievements under the programme; in 1975, the national rally was attended by over 7,000, of whom 214 were singled out for special awards, and grants of extra government resources were awarded to 2,500 villages throughout the country which had done well in the previous period.

Villages have now been classified into three ranks: "basic" or underdeveloped villages; "self-helping" villages; and "independent" villages (Brandt and Lec 1977, p.42) The criteria of classification are worth noting for their formal similarity to the criteria used to rank the FLIA, as discussed shortly:

	<i>Type of Village</i>		
	<i>Basic</i>	<i>Self- helping</i>	<i>Independent</i>
% of rice fields which are irrigated	80	85	98
size of village capital fund(US \$)	\$600	\$1,000	\$2,000
average savings level per household	\$20	\$30	\$40

The amounts and type of government aid vary according to which category a village is in. Until 1975 more aid was given to the more "independent" than to the "basic" villages to stimulate the basic villages to improve themselves. In 1975 and 1976 more aid was channeled to the less successful villages; but this change generated criticism from the better-off villages, whose leaders complained they were not being adequately rewarded for their efforts, and subsequently the policy of "incentives for outstanding achievement" has been reintroduced.

The proposed reform of canal management is an attempt to apply similar principles. What makes it particularly noteworthy at present is that it is only now, in 1979/80, being introduced, and its monitoring over the next few years would provide a way of studying the effects of a certain type of policy instrument whose relevance extends far beyond irrigation and agriculture.

The Motivation Problem in Canal Irrigation

In the past few years a new debate has been emerging amongst people

concerned with agricultural development policies. Its focus is on the widely-observed poor performance of canal agriculture in the tropics and on the remedies that should be adopted. Put at its simplest, it centres on the question, "How much of the poor performance can be attributed to inadequate physical structure(technology, and how much to poor canal management?" (Bottrall 1978; Chambers 1979; Wade 1979b and references therein.)

I do not wish to enter this debate here, except to report one of the conclusions of those who emphasize the management factor. It is that the large potentials for improving the the performance of canal agriculture is the being realized (or is being realized slower than need be) because the incentives on canal managers are such as to prompt them to put more weight on avoiding the social conflict which rationing a scarce resource like water generates, than on capturing the full economic gains from efficient use of water. This in turn has to do (in part) with the fact that there is no obvious mechanism by which public managers could reap some economic or prestige benefits from improved water allocation, so that these powerful incentives to change are in operative.

The link found in South Korea's FLIA (and also in the Irrigation Associations of Taiwan and Italy⁴) between the budget (and therefore staff salaries) and farmers' water payments might provide a greater incentive for efficient management than exists in the strictly civil service type of administration found in South Asia, where no link exists between canal budget and farmers' water payments; but the link is weak, partly because the incentives (coupled with severe punishment if the incentives fail to work) on farmers' payment can be made so strong as to break any connection between their payment and the overall efficiency of canal operation.

The proposed reform in South Korea is an attempt to motivate staff to do their job better, not by giving them a direct share of the gains from improved efficiency, but by rewarding them for doing things which are in turn presumed to be conducive to improved efficiency. As such, the reform is of wide interest in showing one possible way around a recurrent problem of irrigation improvement in private-property economies, and indeed of improving the performance of public institutions generally: the lack of a well-defined mechanism that would link responses of public institutions to the large social payoffs from improvements.

The FLIA

The FLIA were introduced to Korea by the Japanese colonial government, transferring a form of irrigation organization already well de-

⁴ On Italian irrigation organization, see Wade (1979a).

veloped in Japan. There are now 122 such bodies, with an aggregate irrigated area of 392,000 hectares and 774,000 "members" (any irrigator who draws water from a FLIA-run source is a member).⁵ (Most of Korea's irrigated area, however, is irrigated from a source with an irrigated area of less than 50 hectares, and is therefore not included in a FLIA. 900,000 hectares out of the total (paddy) irrigated area of 1,300,000 is non-FLIA.) Most of the FLIA are between 500 and 3,000 hectares in size; only seven out of 122 have an irrigated area of over 10,000 hectares. By South Asian standards even the biggest of the FLIA systems are very small scale, and they are small even in comparison with Taiwan's Irrigation Associations.

Staffing is however very dense by South Asian standards: one full-time employee for 80 hectares on average, *excluding* parttime employees (notably the lowest rank of field-worker, called the "patroller", who is responsible for raising and lowering water gates and carrying out routing inspection and maintenance. Patrollers are part-time, since they are employed only during the irrigation season from April to September.) On the 11,000 hectare project I studied, there are almost as many part-time staff (138) as full-time employees (148). If this is typical, then the national staffing ratio including the patrollers and other part-time staff, is roughly one employee for 45 hectares.

The full-time staff are divided into administrative and technical categories; the technicians are divided into "management," and land development (which involves the design and construction of a denser network of fieldchannels and drains to individual, rectangularized and consolidated fields). "Management" is further divided into maintenance of canals, drains and pumps on one hand, and canal (and pump) operation and agricultural extension on the other (the latter two functions being combined in the same person). On the scheme I studied, there are 62 people on the administrative side, 115 technicians, and 109 patrollers; of the technicians, about 30 are specialized in canal operation and agricultural extension.⁶

The canal's irrigated area is divided into sub-divisions, each with a field office located within it. On the scheme I studied (henceforth called SY FLIA, SY being a pseudonym), 113 of the employees (excluding the 109 patrollers) were in the 10 field stations,⁷ 64 were at headquar-

⁵ Figures on the FLIAs come from Ministry of Agriculture and Fisheries, Agricultural Development Corporation, 1978; Ministry of Agriculture and Fisheries, FLIA Management Bureau, 1978.

⁶ Of the administrators, 48 are full-time permanent, 14 are paid on a daily wage; of the technicians, 100 are full-time permanent, 15 are paid on a daily wage. The President and Manager are both classed as technical, since they both have technical backgrounds.

⁷ Two of the field stations were for other than canal operation and repair, one for operating a reservoir only, another the agricultural machinery office, both of them

ters in the local town. Supervision of the patrollers is done by *all* the staff of each field office, including administrators as well as technicians. Each field office staff member is responsible for supervising one to three patrollers; which entails a once or twice daily trip to the jurisdiction of the patroller to ensure that he is on the job, and possibly to consult over what work he is or should be doing next.

Virtually all the staff are local people, whose homes are within the command area. There are special examinations for entry to the graded ranks (the professional hierarchy),⁸ but no minimum educational requirements. Recruitment to the more senior positions is very largely by internal promotion. Typically a man will join at a young age as what is called a "temporary employee", will within a year or two be made a "permanent employee", may then a few years to a decade later sit the examination to enter grade 5, and then be subject to internal promotion except for another examination to pass from grade 4 to grade 3 (though in the past few years an increasing proportion of grade 5ers have been young high school graduates successful in the examination, a trend which has caused some friction within the FLIA between old and young grade 5ers). The examinations are set a special examination department of the provincial government, which also does the marking. Each FLIA has fixed number of positions at each grade, depending on the size of its irrigated area. Since for each person once at grade 5 the FLIA is normally seen as providing life-time employment, promotion is typically slow, unless a person is recognized as exceptionally good. There is no ladder out of the FLIAs to the ranks of the central government.

The Ministry of Agriculture sets the rules for what the FLIAs can and cannot do. In most ways they are treated like semiautonomous public enterprises, and come within the purview of public enterprise legislation. The government sets staffing scales, salary scales, conditions of service and the like

In the Ministry of Agriculture (a central government organ only, not having a direct extension to provincial level and below) is a bureau concerned to monitor the operational activities of FLIAs. Each provincial government also has a bureau for monitoring the FLIAs within its jurisdiction. The appointment of the Presidents of the largest 22 FLIAs is made after close consultation between these two offices, the appointment being made formally by the Minister of Agriculture. For smaller FLIAs the appointment is made by the provincial governor on the recommendation of the (government-appointed) head of the county administration. The budget sanction and scrutiny of each FLIA follows similar lines, ex-

taking 11 of the 113 staff in field stations, leaving 103 staff for about 11,000 irrigated hectares, excluding the patrollers.

⁸ Of the total staff at SY FLIA, 38 administrators and 61 technicians are graded staff.

cept that the budgets of *all* 122 FLIAs have to be approved by the Ministry of Agriculture as well as by the provincial government. At either provincial or central government level, changes in a FLIA's budget can be ordered.

Within the FLIAs, power is 'formally tightly concentrated in the hands of the President. He makes promotion decisions (though he does not have power to decide which successful candidates in the grade 5 exam should come to his FLIA; that is with the provincial administration).

The principle means of control over the FLIAs by government, then, are (1) the appointment of the President, (2) the structuring of authority within the FLIAs to concentrate it in the hands of the President, and (3) control over the budget, through the requirement for prior approval and annual (government) audit. In addition, there are regular and irregular government inspections of operations, property and records.

What Was Going Wrong?

Despite these extensive powers over the FLIAs, the Ministry of Agriculture has recently become aware that the FLIAs are not performing adequately. Specifically, the Ministry perceives four features which it wishes to correct.⁹

- (1) A relative decline in water charges: average charges have declined from 5.8 percent of average rice yield in 1966 (18.8 kgs. compared to 323 kgs. of rice per 0.1 hectare), to 3.7 percent in 1977 (18.5 kgs. out of 494).¹⁰
- (2) An increase in the relative weight of administrative expenses: general administrative expenses (including salaries) now account for 25 percent of total (noncapital) expenditure on average; but 55 percent of the FLIAs spend more than 30 percent for this purpose.
- (3) A decrease in the relative weight of maintenance expenditure, while the number of facilities to be maintained increases: in the 16 years between 1958 and 1973, total administrative expenses were more than 75 percent of maintenance and rehabilitation expenses in all years but one, and greater than 100 percent in six years. Maintenance expenditure now accounts for 36 per cent of

⁹ The following is based on Ministry of Agriculture, FLIA Management Bureau, 1978, supplemented by interviews with concerned officials.

¹⁰ The yield averages are those used by the Ministry's FLIA Management Bureau, and are national FLIA plus non-FLIA averages. The reason for using the FLIA plus non-FLIA average is that the latter is calculated by the Ministry of Agriculture on the basis of sample surveys, the FLIA yield figures, as reported in the *Yearbook*, are based on self-reporting by each FLIA and are thought to be upwardly biased.

total expenditure on average, but the Government estimates it should be at least 40 percent, and only half the FLIAs reach this level.

- (4) A reduction in the relative size of each FLIA's savings fund, and an increased dependence on borrowing: the government gives cheap long term loans for maintenance and repair, but the loans cover only 70 percent of the total cost; and in practice relatively little money is available to the FLIAs under this heading. If money has to be borrowed for maintenance and repairs on a long term basis, much of it has therefore to be borrowed at the ordinary, very high, rate of interest. More importantly, however, many FLIAs are now in a situation where much of the revenue from water charges (which accrues in a short period after the paddy harvest) goes to pay off the previous year's debts and interest, with the result that the FLIA again runs into debt later in the year and has to borrow short term to maintain its operations. The high interest rates in South Korea make this a heavy burden.

What are the reasons for these trends? The Ministry believes the problem lies with the incentive structure facing FLIA staff. As stated in the Ministry's booklet describing the reform and its rationale, the staff have "lost the will to modernize facilities, increase savings, increase financial independence". There is also a problem of the farmers' attitude: "they want to rely on government loans for maintenance expenses, and want water charges to decrease year by year" (Ministry of Agriculture, FLIA Management Bureau, 1978, p.7-9). The proposed reform, however, is directed to the incentives and attitudes of staff, not to the attitudes of farmers.

The Irrigation Reform

The reform aims to secure the compliance of FLIA staff in solving the above-mentioned problems by making their salaries dependent in part on their compliance. The FLIAs are to be divided into three grades, A, B and C. This in fact reintroduces a three grade classification in use until the early 1970s. But whereas the old classification was based simply on irrigated area, so that staff in bigger FLIAs got higher salaries than those in smaller, the new classification relates salary to the attainment of certain levels of performance. There are basically two criteria of classification: (1) the adequacy of the physical structures, and of water supply throughout the command area; and (2) the adequacy of the FLIA's own financial reserves, which is the inverse of its need to borrow for expenditure on other than major construction. 'A' FLIAs must have a savings fund of at least 85 percent of annual current expenditure: 'B', 80

percent; 'C', the rest. (The average size today is only 51 percent.) The ranking of all 133 FLIAs will be done by the staff of the Ministry's bureau responsible for supervising the FLIAs.

'C' FLIAs will continue on the present salary scale; 'B' FLIAs will get salaries 15 percent higher; and 'As' will get another 15 percent on top of that. With this change the staff of 'A' FLIAs will receive salaries almost as high as the staff of the prestigious national irrigation construction organization, the Agricultural Development Corporation (a parastatal), and considerably higher than central government employees of equivalent rank. In contrast, from the early 1970s until the present, all FLIA staff in South Korea of the same grade and length of service have been paid the same (though full use has been made of non-pecuniary award for FLIAs which get high average rice yields, or successfully help farmers fight a pest outbreak, or successfully protect farmers against a drought, in the form of display certificates signed by the provincial governor, or the Minister of Agriculture, or by the President of South Korea himself). The Ministry firmly believes that the uniformity of salary has sapped motivation amongst the FLIA staff (and presumably that non-pecuniary incentives have not been very effective).

It is expected that for the first few years, at least, very few of the FLIAs will make the 'A' grade (though in principle there is no limit to the number of FLIAs which can be so classified). To give a more immediate incentive for *improvement*, however, there is another component in the reform. All government employees in South Korea get a "bonus" of 400 percent of their monthly salary each year automatically; as do the FLIA staff. In addition to this regular bonus, the reform proposes an "incentive bonus" for FLIAs. Each year all the FLIAs will be assessed against several performance indicators, and the progress of each since the previous year measured. The indicators are these:

- actual staff in relation to authorized staff (authorized according to the scale which links number of staff with size of command area): roughly speaking, the lower the better;
- the weight of general administrative expenses in total expenditure: the lower the better;
- the weight of the repair and maintenance expenses in total expenditure: the higher the better;
- the size of the depreciation fund in relation to total expenditure: the bigger the better;
- the size of "other savings" in relation to total expenditure: the higher the better;
- the amount of interest paid as a proportion of total expenditure: the lower the better.

Whereas the A,B,C classification depends on *level*, the incentive bonus

depends on *change* since the previous year. Those who do best will get another 100 percent of monthly salary as an incentive bonus for that year; those who do next best, 75 percent; next-best again, 50 percent.

There is no fixed number of FLIAs which can receive any of these bonuses; that is decided year by year by the Ministry, which also—it is important to note—decides year by year (presumably in advance) what weighting to give each of the indicators, depending on what problems it thinks most pressing. The instrument, then, is highly discretionary in application.

But the FLIAs do have general targets to guide them: management expenses should not be more than 30 percent of the total, maintenance should be at least 40 percent, the savings fund should be at least 100 percent of current expenditure, and the depreciation fund should rise from 36 kgs. of rice per hectare to 150 kgs. by 1982. With these targets the FLIA are given an idea of what the Ministry considers good levels of performance.

Finally, the motivation problem will also be tackled by improving and expanding the in-service training given to staff. Already in 1978 150 FLIA administrators and 350 technicians have been given training for periods of two and three weeks each, at a central training college. The most senior staff are to be given not vocational but leadership and political training at the national *Saemaul* Movement college. It is hoped that as well as improving the staffs' ability to do their jobs, the education will also "make a closer relationship between staff and members", by promoting a "close and positive attitude" of staff towards farmers. Only to this very minor degree does the proposed reform talk about the connection between staff and farmers.

FLIA Staff's Reaction to the Reform

At SY FLIA, one of the biggest and said to be one of the best in the country, reaction to the proposed reform was unenthusiastic, bordering on hostile. One senior staffer called it "an interruption and a worry". The reaction is based on five main grounds: (1) The staff dislike the attempt to use income as an incentive. As several said, they already work at the maximum anyway, so it cannot lead to increased effort. One man commented, "It is a mean affair, because the staff of FLIA everywhere do the same work, put in the same effort, regardless of whether the FLIA is A, B, or C". (2) In fact, they went on to say, the new scheme discriminates against *new* FLIAs which have to spend relatively large amounts on getting the "bugs" out of the technology at the beginning, and can devote less income to the savings fund - on which, as they see it, the A,B, C, ranking basically depends (since it is readily quantifiable, while "ade-

quacy of physical structures”, “adequacy of water distribution” are not). (3) No FLIA, said a senior man, wants the goal of complete financial independence from the Government - not least because the rate of interest on loans is lower than the rate of inflation, so the FLIA managers want to borrow rather than save (despite the high rate of interest - which in the Ministry’s eyes imposes a heavy burden on the FLIAs’ finances). (4) The new measures will prompt increases in water charges, especially in the case of FLIA trying to get into the “A” rank, and there is a general feeling at SY FLIA that current charges should not be increased further because the farmers could not afford to pay more. (5) The staff see it as an attempt by the central government to push them around. “It is central government’s plan”, said one, “and does not give enough consideration to the staff of the FLIA”. Greater financial independence will not, they think, lead to less overall Government control.

Relatively little is known about the perceptions of staff in parastatals and field agencies towards the central government in South Korea, and it may perhaps seem surprising that the criticism of the central government reform was as strong and as outspoken. It is also worth noting the feeling amongst the staff at SY FLIA of common interest with staff of “FLIAs in general” (and especially *new* FLIAs), even though there is no formal national association of FLIA staff through which a sense of corporateness might be fostered,¹¹ and even though the staff at each FLIA tend to stay with that FLIA for life, rather than move from one FLIA to another. And finally, it is worth noting that the salient point for discussion amongst staff was not so much how much better off they’d be if they made “A” grade, but whether they would have to increase water charges - there was a distinct reluctance to do so. (It is not the case that there is close and continuing interaction between irrigators and staff, nor do irrigators have any formal representation in FLIA decision-making; there is nevertheless a sense of accountability of staff to irrigators, an awareness of what “the irrigators” as a body will tolerate and what they will not. I make the point to draw the contrast with South Asia, where this sense of accountability is lacking, though formal representative politics are of course more fully developed there.)

Conclusion

If the reaction of staff at SY FLIA is at all typical, the effect of the reform in terms of its intended objectives is less than certain. This adds to the interest of the case as a case study of the use of one major type of policy instrument, the discretionary manipulation of a private or parastatal

¹¹ There is a Union of FLIAs, but it does not have this effect (having been until recently moribund).

organization's field of choice. Suppose, for example, that the FLIAs are slow to respond. At what point will instruments based on discretionary command be used to reach the objectives? And one would like to know, in this context, why the existing mechanisms of control, through the appointment of the President and through approval and audit of the budget, have not been effective means of reversing the unwanted trends. Further, there is the question of the connection between improvement in terms of the stipulated indicators on the one hand, and on the other, in terms of the staff's capacity to control water and their utilization of that capacity to provide a reliable and adequate water supply to irrigators. The reforms will give an incentive for relatively more to be spent on improving the capacity for control via improving the physical structures, but may do little to improve the present low standard of utilization of control capacity. "Adequate standards of water distribution" is only one of several performance indicators, and being the least measurable will probably be the one to which least attention is given.

It would be interesting to pursue research in this area by comparing the path of the South Korean reform as it evolves with the Taiwanese reform of Irrigation Associations in 1975. The form of organization in the two cases is, as mentioned, close: both are decentralized parastatals with responsibilities defined on a watershed basis; both owe much to their common origins in Japan's Irrigation Associations. The 1975 reform in Taiwan seems however to have been in the opposite direction to South Korea's proposed reform: towards a more centralized administration. The 24 existing Irrigation Associations were consolidated into 16; the locally elected Irrigation Association's Representative Assembly was abolished (something which happened in South Korea in 1961); the Irrigation Association's Chairman and senior technical staff were appointed by the head of the Department of Reconstruction upon the recommendation of the Provincial (that is, all-Taiwan) Water Conservancy Bureau; and the national government was to be given greater control of the Associations' financial affairs.

One of the major questions about the Taiwanese reform is whether the appointment of the Irrigation Association's leadership by the national government has led or will lead to a neglect of the needs of the farmers, a commitment to which has been one of the distinguishing features of the Irrigation Associations in the past. Of course, in South Korea's case the President (equivalent to Taiwan's Chairman) has been appointed by the government ever since 1961, and there is certainly no suggestion in the reform to give the irrigators a role in the selection of the President and senior staff, nor to give them any role in seasonal or long term water or financial decisions. Nevertheless, two points of difference between Taiwan's and South Korea's organizations suggest that the problem of

getting out of touch with irrigators' needs may be less serious in South Korea's case than in Taiwan's since the 1975 reform. First, the FLIA are very much smaller in size than the Irrigation Associations; the orientation of their staff, including the senior staff, is more wholly local. Second, the FLIA Presidents are appointed by the Ministry of Agriculture, while the Irrigation Associations' are appointed by an engineering-oriented agency - which makes it more likely that the appointments will have a technocratic bias.

Finally, there is the question of why the reform has been introduced now rather than earlier. Again it is useful to bear in mind the Taiwanese comparison. One can understand the currently very high levels of water use efficiency¹² reached in Taiwan (Levine *et al.* 1976) as a response to certain environmental conditions: to very limited agricultural land, relatively high yielding varieties and a scarcity of easily developed water sources, which combined to place a high value on water use efficiency in relation to the costs of providing this efficiency. In South Korea levels of water use efficiency are much lower than in Taiwan (one indication being that rotational delivery of water to sub-units of the command area is not practised in South Korea, but has become normal in Taiwan since the earlier 1954-55 reform and has resulted in large gains in water use efficiency). Yet all of the above-mentioned environmental factors which help explain high efficiency levels in Taiwan are also found in South Korea. Why then has action to improve system performance not been taken in South Korea until so recently, and why is rotational irrigation still not promoted by the new reform, despite the evidence from Taiwan on its efficiency-enhancing effects?

Part of the answer lies with a further environmental factor: South Korea's temperate climate permits only one irrigated crop a year, Taiwan's tropical climate permits two or more, and the opportunity cost of water wasted in one season is therefore higher in Taiwan, lower in South Korea. Yet one needs to remember that the above-mentioned environmental conditions have existed in Taiwan since the 1920s, but it was not until the 1954-55 island-wide drought that widespread measures were taken to increase water use efficiency to near its present high levels.¹³ Clearly there is more to the explanation of these high levels than simple environmental pressures or rising opportunity costs. Just what these additional factors are is not clear. However, compared to South Korea

¹² Water use efficiency is defined in a technical rather than economic sense, as the proportion of the water fed into a system which reaches the fields.

¹³ Compare the Hayami-Ruttan (1971) theory that new technology creates a demand for institutional change by opening up productive opportunities which are unrealizable without the institutional change. In Taiwan the gap between the period of high opportunity costs to unreformed irrigation institutions and the reform response was long.

Taiwan has until recently given more emphasis to rural development and foodgrain self-sufficiency, and this difference is presumably important in understanding the difference in the timing, content, and implementation of irrigation reform in the two countries, though just what the connections are remains to be investigated.

South Korea's recent irrigation reform, then, raises issues of wide interest. In this paper I have raised some of them, in the hope that other scholars may follow them up.

REFERENCES

- Abel, M., 1975, "Irrigation Systems in Taiwan: Management of a Decentralized Public Enterprise," Dept. of Agricultural and Applied Economics, University of Minnesota. (mimeo)
- Aqua, R., 1974, "Local Institutions and Rural Development in South Korea," Cornell University, Special Series on Rural Local Government.
- Bottrall, A., 1978, "Technology and Management in Irrigated Agriculture," *Overseas Development Institute Review* 2, ODI, London.
- Brandt, V. and Man-Gap Lee, 1977, "Community Development Program in Korea," (mimeo) Korea National Commission for UNESCO, May.
- Chambers, R., 1979, "Towards a Water Revolution: Irrigation Research Priorities in the 1980s," (mimeo) Paper Prepared for Institute of Development Studies Workshop on 'Water Bureaucracy and Performance,' November 29-30.
- Hayami, Y. and V. Ruttan, 1971, *Agricultural Development: An International Perspective*, Johns Hopkins Press, Baltimore.
- Jones, L. and Il Sakong, 1978, "Government and Entrepreneurship in Economic Development: the Korean Case," (mimeo) Korea Development Institute, *Working Paper 7802*.
- Levine, G., L. Chin, and S. Miranda, 1976, "Requirements for the Successful Introduction and Management of Rotational Irrigation," *Agricultural Water Management*, 1, pp. 41-56.
- Oh, Ho-Sung, 1978, "Customary Rules of Water Management for Small Irrigation Reservoirs in Korea," *Journal of Rural Development* 1 (November), Korea Rural Economics Institute, Seoul.
- Korea, Ministry of Agriculture and Fisheries, Agriculture Development Corporation, 1978, *Yearbook of Land and Water Development Statistics 1978*, Seoul.
- Wade, R., 1979a, "Collective Responsibility in the Operation of Maintenance of Irrigation Canals: the Case of Italy," *Economic and Political Weekly* (Bombay), Review of Agriculture, December.
- Wade, R., 1979b, "Irrigation Potential and Performance: Man Mismanagement on South Indian Canals," (mimeo) Paper Prepared for Institute of Development Studies Workshop on 'Water Bureaucracy and Performance,' November 29-30.

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