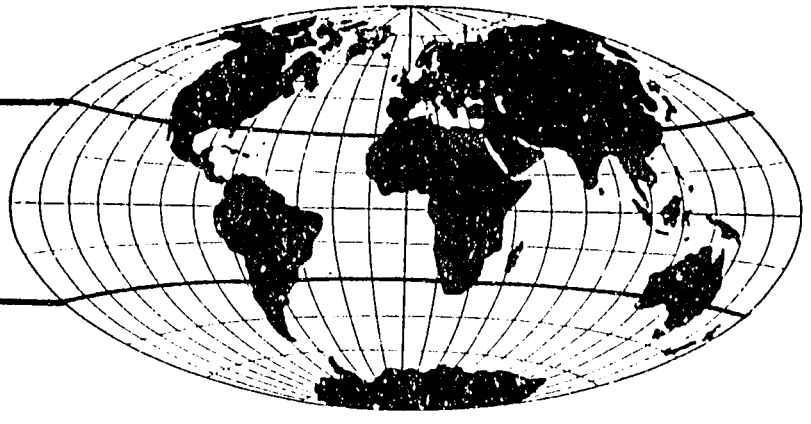
COOPERATIVE AGREEMENT ON SETTLEMENT AND RESOURCE SYSTEMS ANALYSIS

RIVER BASIN DEVELOPMENT
CASE STUDIES WITHIN THE TANA RIVER BASIN OF KENYA

by

John K. Kimani

June 1988



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INTRODUCTION

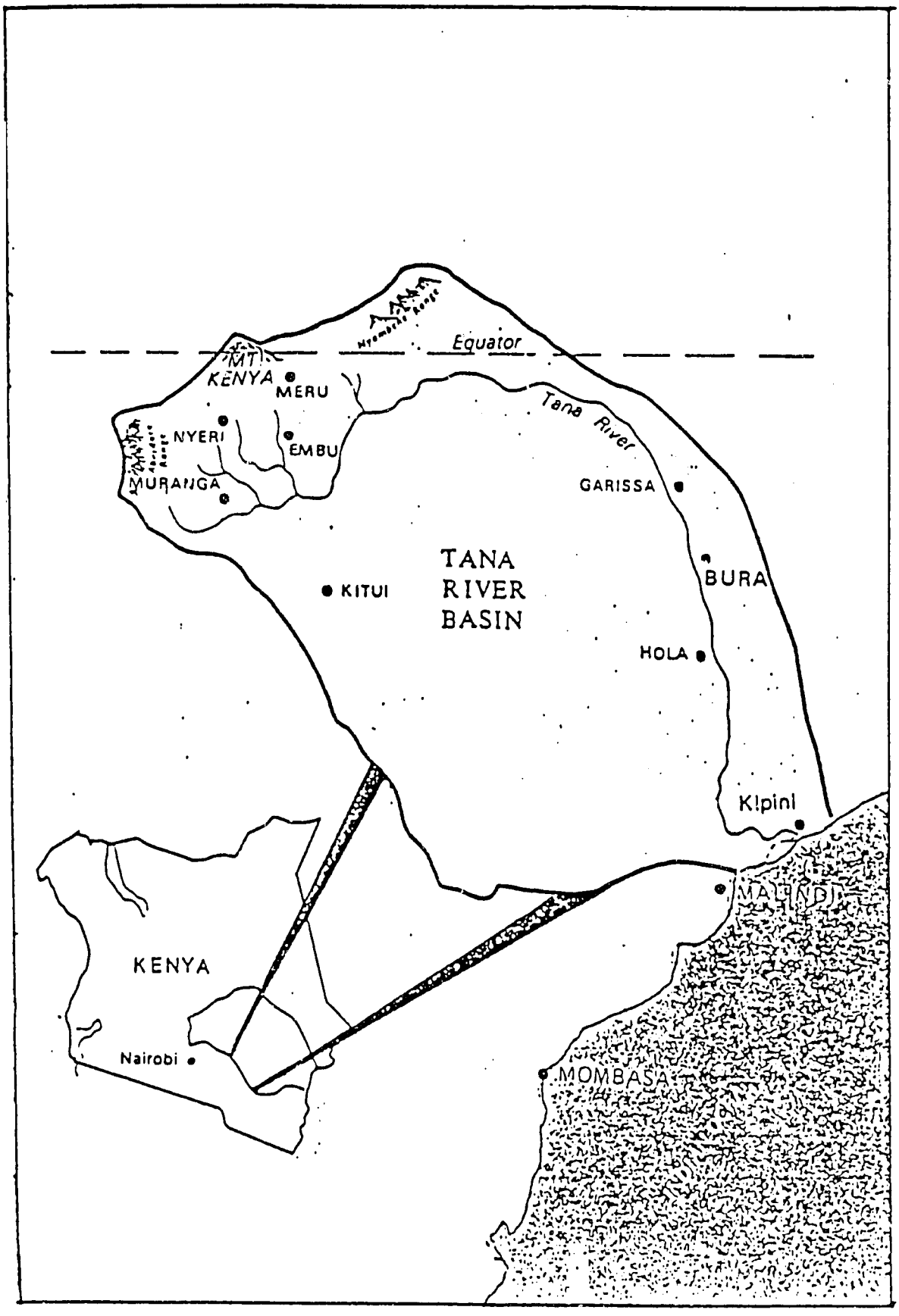
The Tana is the largest river in Kenya, with a catchment area of 100,000 square kilometers. The climatic pattern of the basin is greatly influenced by altitude--the upper catchment is fairly cool and wet, while the middle and lower reaches are hot and semiarid. The exception is the coastal fringe, which is quite wet (Figure 1).

The population distribution matches the climatic pattern, with 75 percent of the population located on the upper catchment. The middle and lower catchment areas are sparsely populated, apart from the coastal fringe and a riverine band on the lower Tana where flood-based agriculture is feasible.

Settlement of the Tana River Basin is estimated to have started during the sixth century. Bantu-speaking peoples moving northeast along the coast were supposedly diverted northward using the river as their point of reference. These migrants moved northward and later settled in the wetter highlands around Mount Kenya. Their economy was largely agrarian, but later included limited livestock rearing. In the wet highlands, agriculture was entirely rain dependent, and no attempt was made to irrigate. Populations that settled along the river in the lower basin, however, where rainfall is scarce, started flood irrigation, a practice continued to this day. Two seasonal river floods occur--in April and November--and follow the seasonal pattern of precipitation in the upper catchment.

At the turn of the century, the Kenya-Uganda railway was installed, thus opening the country's hinterland to occupation by British immigrants. The colonial era of Kenya had arrived. British settlers made territorial claims on large areas of land in the upper Tana catchment, which triggered continued resistance from native inhabitants. This resistance culminated in the Mau Mau

Figure 1-Map of Tana Section of Kenya



emergency (1952-1959), when thousands of Kenyans were detained in concentration camps located in remote areas of the country.

In response to this native agitation for land, the colonial government proclaimed a number of radical agrarian initiatives that included irrigation development. The need to occupy thousands of detainees during the emergency gave added impetus to these initiatives and permitted simultaneous development of irrigation at Mwea and Ishiara in the upper Tana basin as well as at Hola in the lower basin.

Irrigated production within the Tana basin, however, predates the Mau Mau emergency. The precolonial flood-based irrigation, located on the lower Tana, has been mentioned. Later, large-scale irrigation activities were carried out by European settlers who utilized water to grow supplementary cattle fodder or vegetables for domestic use. Another example of Tana basin irrigation, predating the Mau Mau period, is the horticultural irrigation project at Kangocho near Karatina on the upper catchment. As part of its World War II effort, the colonial government in Kenya alienated some land near Karatina and, using the Ragati River (a tributary of the Tana), grew vegetables for processing and supply to British soldiers in East Africa. After the war, the irrigated land reverted to its original native owners. Irrigation was not reactivated until the mid-1970s--largely by an unemployed younger generation of school leavers.

Among all the irrigation developments within the Tana River basin, however, none have attained the prominence of the Mwea irrigation scheme. Consequently, an attempt will be made to focus on Mwea, examine the nature and origin of its institutional arrangements, and distill some useful lessons. In addition, brief reviews of several irrigation projects within the Tana basin will be presented in order to draw a comparison with Mwea.

MWEA IRRIGATION SETTLEMENT (MIS)

Project Profile

The total area of the Mwea Irrigation Settlement (MIS) is approximately 12,145 ha, of which only 5,830 ha is cultivated under rice monoculture by 3,234 smallholder farmers--each irrigating 1.6 to 2.0 ha. The remaining area is devoted to the cultivation of rainfed subsistence crops or occupied by farmer villages, roads, trading centers, and other social infrastructure.

Irrigation water is extracted from two tributaries of the Tana River and conveyed to the fields via two main canals and a network of feeder channels. Excess water is drained back to the rivers through collector-drains systems. Water is retained in 0.4-ha (one-acre) fields by means of levees or bunds, with each farmer allocated four such fields. In most cases, each farmer has an independent inlet and outlet. A number of farmers share one feeder canal, however, whose operation must be carefully managed in order to obtain equitable water allocation.

Irrigated rice production at Mwea is a joint effort between the government's National Irrigation Board (NIB) and tenant farmers. The role of each party will be reviewed later when we examine institutional arrangements pertaining to the project.

The project was started in 1954, at the height of the emergency. At the time, the Mwea area was the site for seven Mau Mau detention camps. In order to give the detainees gainful employment, they were deployed in the construction of the head works, excavation of the two main canals, and in leveling and bunding (erecting levees) of the fields.

It is not yet clear whether the choice of Mwea as a location for the seven prison camps was influenced more by its relative remoteness or by the explicit

objective of using cheap detainee labor to construct a river-irrigation project. It is certain, however, that around 1951, the Ministry of Agriculture had successfully conducted rice trials at Mwea (Nguka swamps). Consequently, by 1954, with detention camps already in place, these trials were reactivated and the colonial government was increasingly committed to initiating an irrigation project at Mwea.

Within a period of six years (1954-1960), the two intake structures and main canals were constructed, some 1,330 hectares were level-terraced, and the basic procedures for rice production were established. Since then, the net irrigated area has expanded to the present 5,830 ha, with a mean paddy yield of 5.0 tons per hectare. Only one crop is grown, as research has demonstrated that a second crop, under Mwea conditions and existing rice varieties, produces subeconomic yields.

On the basis of a government directive, however, a second crop was attempted in 1984 and 1985--with disastrous results (Table 1). In spite of impressive vegetative growth, seed setting was poor--resulting in low mean paddy yields of 2.7 tons--compared to a single-crop yield of 5.0 tons/ha. The total 1986 crop--when double cropping was practiced--produced 26,407 tons, compared to 27,553 tons of single cropping during the previous year. At the farmers' level, the results were worse. The mean farmer income declined from KSh 12,776 to KSh 9017, a decrease of 29.4 percent (Table 2).

Previous research findings and experience with the first double cropping in 1985 would have suggested that double cropping was untenable at Mwea. At approximately the same time, however, an animal-feed project was initiated and located opposite the present rice mill. The project was based on a sophisticated process of converting paddy straw into animal feeds. Year-round

Table 1

Comparison of Single and Double Cropping of Rice at Mwea Irrigation Scheme

Crop Year	Number of farmers	Crop Area (ha)	Total Crop Production (m tons)	Gross value	Total Payment to Farmers (KSh'000)	Payout to farmers as a percentage of gross value of crop
1984/85 (Single Cropping)	3234	5825	27,553	81,613	41,318	50.6%
1985/86 (Double Cropping)	3234	8271*	26,407	84,249	29,161	34.6%

*Double cropping was only possible in approximately half of the scheme area due to cultivation bottlenecks.

Table 2

Trend of Mean Farmer Payout in Selected Years at Mwea Irrigation Scheme (in KSh)

	1965/66*	82/83	83/84	84/85	85/86
Mean Payout/Farmer	2,549	11,348	13,853	12,776	9,017
Payout to Farmers as a percentage of Gross Value of crops	59.3%	50.2%	52.1%	50.6%	34.6%

*The year of inauguration of NIB

availability of paddy straw was needed to ensure the project's economic viability. The person in charge of the national provincial administration was the owner of the project, and therefore had more than a casual interest in double cropping at Mwea.

Following so soon after harvesting the main crop, the second crop permitted the farmers little time for resting or performing nonscheme activities. This, together with negligible economic returns, triggered immense resistance from the farmers during the 1986 season, culminating in their total refusal to plant. The management of NIB had to seek forceful intervention of the provincial administration in order to get the farmers to comply.

In a sense, the second crop incident is a clear illustration of how national objectives can be at variance with farmers' perceived interests. The government directive enjoining Mwea farmers to grow two crops was ostensibly aimed at self-sufficiency in rice, and the government went out of its way to provide KSh 28 million to implement the program. Mwea farmers, however, treasured the "free time" between the main crops, since they used this period to unwind, visit relatives, and perform nonscheme functions. A second crop would have to demonstrate significant financial benefits in order to elicit their cooperation. It failed to do this, and they planted the 1986 crop only under coercion. The government has modified the policy since then, and although no definitive ruling has been made, the project is quietly reverting to the traditional single crop.

From the viewpoint of drawing development lessons, the Mwea Irrigation Settlement reflects a rather complex picture. Since it is not feasible to recreate the conditions that promoted the project's initiation and development (the Mau Mau emergency and availability of cheap detainee labor), Mwea may be

regarded as a project sui generis. Nevertheless, it may be useful to review the nature and extent of institutions that have impinged on Mwea, and in the process we may glean lessons for irrigation-development planning elsewhere in Africa.

REVIEW OF INSTITITIONS ASSOCIATED WITH DEVELOPMENT OF MWEA IRRIGATION SCHEME

African Land Development Board (ALDEV)

The African Land Development Board (ALDEV) was established in 1945 as part of the Kenya Ten-Year Development Programme (1946-1955) with the aim of "reconditioning African areas and African settlement." Though performing similar functions, it was separate from the Department of Agriculture and operated on an independent and more flexible budget. The agency was, however, answerable to the Ministry of Agriculture.

When the government accepted proposals in 1949 for a "Mwea Development and Reclamation Scheme," it assigned the implementation of the scheme to ALDEV. Among other things, the scheme proposals provided for controlled grazing and construction of furrows for livestock water supplies as well as for possible future irrigated production. The board was already operating on the upper parts of Kirinyaga, and its expansion into the Mwea area was perceived as the next logical step.

With the onset of the emergency, the accent on the Mwea Development and Reclamation Scheme quickly narrowed to development of a rice-irrigation scheme, and ALDEV began carrying out a range of functions that included:

-- assessing irrigation potential and making arrangements for land acquisition;

-- providing work supervisors for construction of the scheme's physical structures; and

-- paying the salary of the first scheme manager.

Consequently, during the initial years, ALDEV assumed the role of scheme management, and relied on other government departments (agriculture, hydraulic branch of the Ministry of Works, administration) for specialized inputs. With the main construction work already completed, however, the Ministry of Agriculture made a successful bid for a larger role in the operation of the Mwea scheme, arguing that only the ministry had the technical competence to guide irrigated crop production during the post-construction period. Consequently, the Ministry of Agriculture took over accounting functions from ALDEV and the scheme's works supervisors were transformed into assistant agricultural officers. The scheme manager--an agriculturalist--subsequently worked directly for the Department of Agriculture. The board's role in the scheme thereafter ceased.

The Ministry of Agriculture

The Ministry of Agriculture formulated proposals for a Mwea Development and Reclamation Scheme in 1949. Later, the ministry conducted initial experiments on rice production that nurtured dreams of a major irrigation project based on rice. It is unlikely that the project would have evolved the way it did in the absence of the technical breakthroughs achieved by the Ministry of Agriculture in 1949, 1951, and from 1954 to 1960. The experimental plots during these years not only generated agronomic data, but vividly demonstrated the potential of the Mwea plains under irrigation. This in turn fired the imagination of the government.

During the early post-construction years of the scheme, the ministry provided all the staff requirements until 1966, when it was succeeded by NIB.

Even then, the ministry retained a policy-making as well as supervisory role vis-à-vis the new Irrigation Board. In addition, the ministry provided a channel through which development funds from within or from outside the country would be funneled to Mwea.

At the scheme level, the ministry plays a comparatively less activist role and is limited to research and extension advice regarding rain-dependent crops (cotton, sunflower, and--more recently--horticulture).

The Provincial Administration

During the early development of the scheme, the provincial administration coordinated the work of other government departments. As the agency in charge of overall security, the provincial administration--through the local District Commissioner (DC)--had to oversee the siting of the seven detention camps at Mwea and the use of Mau Mau detainees in the irrigation works, and put pressure on the local council regarding acquisition of land to be irrigated. Once irrigation at Mwea seemed possible, the administration pursued the idea as if it were originally its own. Hence, not only did they commit themselves to realization of the irrigation objective, but they committed the entire government.

The provincial administration--through the local DC--continues to chair the Mwea Settlement Committee, which approves the involvement of new farmers or eviction of those who have totally failed to cope with their irrigation obligations.

In 1985, when the farmers demonstrated their objections to a second rice crop by going on strike, the project management turned to the provincial administration for help. Through a series of field meetings, the provincial

administration used a combination of persuasion and force in order to make the farmers comply.

Ministry of Works (Hydraulic Department)

The role of the Ministry of Works was limited to the early construction phase of the Mwea scheme. Through its Hydraulic Branch, the Ministry of Works designed the irrigation structures, canals, and field layout. In addition, its staff acted as superintending consultants at the time of the irrigation construction by the ALDEV team.

The National Irrigation Board

After 1966, the National Irrigation Board (NIB) assumed management responsibilities for major irrigation schemes, including Mwea. NIB, which is represented at the project level by the Mwea Settlement Management, is responsible for crop planning, mechanized cultivation, inputs procurement, crop marketing, and maintenance of individual crop accounts.

The relationship between NIB and the farmers is governed by the Irrigation Act, which in turn is based on irrigation rules first promulgated in 1960 and revised in 1962. According to the Act, the farmers are tenants-at-will on one-year leases that are automatically renewable--subject to good performance by the farmers. More specifically, the farmer is required by the Act to provide all the labor demands for the successful cultivation of the rice crop.

The overtly paternalistic behavior of the settlement management is increasingly being questioned, especially because it assigns a dormant role to the tenant farmer. Without the settlement management's singlemindedness,

however, it is improbable that the project would have attained its present level of agronomic performance.

Experience in other parts of the world (Taiwan, Indonesia) and elsewhere in the Tana basin (Kibirigwe, Kangocho, Island Farm) indicate that the farmers at Mwea could be entrusted with more responsibility. For this to happen, NIB will have to review its role and possibly even the legislative framework that created it.

Mwea Amalgamated River Growers' Cooperative Society

As the name implies, the amalgamated cooperative society resulted by merging two previous rice-farmer cooperative societies: one a savings and credit cooperative and the other a consumers' cooperative. The Savings and Credit Cooperative Society is the forerunner of the other two, and was started in 1964 for the purpose of mobilizing farmers' savings and giving them credit facilities.

The cooperative society may be the only institution within the Mwea project that the farmers wholly own and largely control. It provides the farmers with a forum where they can at once indulge their creative impulses and also vigorously engage in political infighting.

The Achievements of the Amalgamated Cooperative Society

Material Benefits (Financial, Credit, Shareholding, etc.)

The initial objectives behind the formation of the farmers' cooperative society was to provide a savings and investment mechanism and credit facilities to the project farmers. On the basis of the stated objectives, the cooperative has been an unqualified success. Every year, farmers would instruct the NIB

settlement management to deduct some money from the rice crop proceeds and credit it to their accounts with the cooperative. Similarly, the cooperative would give credit to individual members, as necessary, on the basis of their savings. Such credit is usually intended for meeting such emergencies as school fees, hospital bills, domestic food shortages, and rice-transplanting labor peaks.

Recently, a banking section has been established, and the cooperative is now able to receive a block check for farmer rice payout from NIB. The banking section therefore performs an important function that was previously executed by NIB, i.e., processing deduction and remittance instructions from individual farmers. Together with loan disbursements, this has made the banking section the most active arm of the cooperative.

In order to better understand the type of loan disbursements made by the society, its expenditure budget for 1987 is as follows:

Item	KSh (millions)
School fees	3.6
Emergencies (health bills, court fines, etc.)	0.8
Rice operations, i.e., weeding and transplanting	3.9
Harvesting	0.7
Purchase of cows	0.8
Total	9.8

Payout from NIB for the 1985-1986 crop was KSh 26 million, which was remitted to the society. Out of this, KSh 14 million was a share contribution in the banking section by the members, and the remaining KSh 12 million went to their savings accounts, which could be withdrawn for regular consumer purchases. A savings account attracts the normal bank rate of 11 percent, while

the share contribution attracts an interest rate of five percent. However, a member who obtains a loan is charged an interest rate of 12.5 percent.

The cooperative owns shares amounting to 40 percent in the rice mill, while 60 percent is owned by NIB. The society has made a bid for an additional 5 percent, but NIB can only sell it at KSh 200 per share, which is far greater than the share's par value of KSh 20 each. The farmers are therefore reluctant to buy the shares at this exorbitant price, and are canvasing for an independent valuer to be commissioned so that the true current value of the shares can be established.

In addition, the cooperative is engaged in the following activities:

(1) Transport--The cooperative has five lorries for transporting clean rice from Wanguru Rice Mills to a central depot 30 km away.

(2) Paddy drying--For more than ten years, the cooperative has been entrusted by NIB with drying ex-field paddy at each of the five reception centers. The cooperative appoints a floor supervisor at the beginning of each season who is charged with the recruitment of drying labor and rebagging of the paddy to the satisfaction of the NIB management.

(3) Supplies for Resale--The cooperative buys a range of supplies for resale to farmers at a comparatively cheaper price. These include hardware, farm tools and equipment, and animal feeds from Unga Ltd. and the rice mills--where the cooperative is entitled to 50 percent of rice-bran production.

(4) Diesel and Gasoling Pump--The cooperative has installed a pump for diesel and gasoline for supplying its own vehicles and for selling to outsiders.

(5) Buildings--The cooperative has two buildings, both of which have been valued at KSh 3 million. Besides using these buildings as cooperative

offices and premises for their shop, the cooperative lets part of the buildings for a total of KSh 195,000 per year.

The society wants to broaden its loan activities, particularly with regard to dairy cows, where 300 grade cows have already been purchased. They hope to expand this project so that 200 additional milk cows can be procured each year. This project will be closely linked with the existing outlet for animal feeds.

Nonmaterial Benefits (Status and Increased Power for Decisionmaking)

The provisions of the Irrigation Act ascribe a role to the tenant farmers little higher than that of employed laborers. Essentially, the farmers are supposed to do what they are told by the NIB management and are not expected to articulate, let alone exercise, initiatives on major project events such as the rice-planting program or water scheduling. Furthermore, the tenant farmers were expected to devote their whole time to matters pertaining to rice cultivation in the project and could not be absent for more than one month without the authority of the NIB management.

The cooperative society, therefore, has opened a completely new domain -- far removed from NIB. In their cooperative society, the farmers are no longer the erstwhile servile tenants. They have acquired a new status as owners and masters of an institution together with its associated real estate, vehicles, and other assets--the very symbols of power! Collectively and through their management committee, the farmers have to make weighty decisions on matters ranging from the hiring and firing of staff members to the purchase and disposal of assets.

This totally new experience for the tenant farmers, where they have an opportunity to learn and make decisions (good and bad) would appear to confer

social benefits to Mwea farmers, as people, comparable to the more easily quantifiable material benefits.

The contrast of an NIB-convened meeting and a general meeting of the farmer cooperative society could illustrate the point. An NIB-convened meeting takes place either in the rice fields or at one of the rice-reception centers, both of which are owned by NIB. Typically, the meeting is a monologue, with the NIB officials outlining the work program and what each farmer is expected to do. Ever so humbly, a tenant farmer or two requests that a point be clarified. Normally, such a meeting takes no longer than one hour.

By contrast, the general meeting of the farmers' cooperative society takes place within the precincts of the cooperative building. The committee members are put on the carpet and go to great pains to answer numerous questions and outright accusations. Like the NIB officials, the Cooperative Committee members sit in front. It is however, the farmers (and not the committee members) who direct the tempo and--sometimes--the agenda of the meeting. The farmers are in charge here.

What are the Factors behind the Cooperative Society's Success?

At a time when a number of cooperative societies in the country are faced with management and cash-flow problems, the Mwea Amalgamated Cooperative Society is financially robust. The reasons for its relatively healthy condition are not difficult to find and may be summarized as follows:

(a) The cooperative society is the only thing the Mwea farmers call their own. Consequently, they tend to take far more interest in its operation than is the case elsewhere in Kenya. Unlike farmers elsewhere in the country, the Mwea farmer neither owns the land he tills nor the plot on which his house stands.

(b) The cooperative society has met the test of utility, since it comes to the farmer's aid at his most desperate moments. He has reciprocated this by his zealous interest in the management of the society's affairs.

(c) The NIB, though at first suspicious of the society's intentions, has over the years contributed to the latter's growth by agreeing to deduct farmers' subscriptions from the rice proceeds and remit them to the cooperative. The board's decision to allocate 40 percent of the rice-mill shares as well as letting of the paddy-drying contract to the cooperative society is further evidence of NIB support.

Factors that Detract from the Cooperative Society's Progress

The initial groups of settlers (1955-1959) originated from outside Kirinyaga District (then part of Embu District), a fact that was resented by the local people. Since 1960, however, new settlers were chosen only from Kirinyaga, the district that accommodates the project. As a result, the majority of the present settler population originate from Kirinyaga.

Considerable mutual suspicions characterize relations between the two groups--Kirinyaga and non-Kirinyaga. Hence, the election of cooperative executive members and the employment pattern within the cooperative secretariat reflect the relative political power of the two groups. One recent situation illustrates the point. When the cooperative secretary manager--who originates from Kirinyaga--resigned to assume the duties of a chief in the provincial administration, the executive committee was reluctant to fill the vacancy with the assistant secretary manager, regardless of his apparently sound credentials. The committee sought and obtained the services of a government cooperative officer to temporarily fill the vacancy until a suitable candidate could

be found. It was learned that the assistant secretary manager was disqualified from filling the vacancy because his parents originated from outside Kirinyaga. A recent political directive forbidding government cooperative officers from countersigning cooperative checks has brought the matter to a head, and the executive committee appointed a person who was junior in service and qualifications to the current assistant secretary manager. The post of assistant secretary manager was redesignated as "cooperative accountant."

Other factors that detract from the cooperative society's progress include the introduction of intra-district party politics into the society. At times this has resulted in executive committee members being elected not solely on the basis of competence, but largely on political alignments.

Other Government and Nongovernment Agencies

Law and Order Institutions

The high yields at Mwea basically arise from a package of programmed field activities that include continuous farmer education. There are a few recalcitrant farmers, however, who make it necessary to enforce the irrigation rules. This rather unenviable role is played by the police who process such cases, and the local judiciary who impose appropriate sentences. In the event that the farmer is unable to pay the fine, the farmer may be committed to the local prison. In addition, the prison department supplies free labor to the project two to three days a week for cleaning the main canals and collector drains. The scheme reciprocates by supplying irrigation water to the prison farm and performing major repairs on prison tractors free of charge.

Kirinyaga County Council

The land on which Mwea is located is vested in the Kirinyaga County Council, which holds it in trust on behalf of the people of Kirinyaga District. It took considerable persuasion and cajoling by the government before the council would agree to the project. As compensation, the council was allowed to levy cess on paddy, a practice that was discontinued five years ago.

National Cereals and Produce Board

This board provides the principal outlet for the marketing of rice and other grains. By consenting to pay harvesting advances (at KSh 20 per paddy bag of 80-90 kg), the board directly contributes to the harvesting effort. At the same time and for the same purpose, the board makes arrangements for supplying maize grain to the farmers' cooperative society for distribution to the farm community. This is necessary because harvesting takes place during the dry season (December to February), when food within the project area is in short supply.

In return, the National Cereals and Produce Board has the sole monopoly for marketing milled rice from Mwea and other NIB schemes.

Ministry of Education

There are two areas in which the Ministry of Education is involved with the Mwea project. First, the ministry permits farmers' children attending school within or outside the project to continue with their classes pending payout of rice proceeds. This is arranged by the project management writing to individual schools and giving an assurance that school fees will be remitted by the management as soon as rice proceeds are processed. Simultaneously, the farmer has to fill in a "willingness form" advising the management of the amount to be remitted.

In 1973, after completion of the last irrigation block (1,000 ha), the transplanting-labor shortage that had been growing with the scheme's expansion reached crisis proportions. The general manager of NIB asked the Ministry of Education to alter the dates of school holidays in Mwea in order to coincide with peak requirements for transplanting labor. This, it was argued, would allow children to help their parents to complete the transplanting of their four fields within the ideal time--seven to ten days. It may be noted that delays beyond ten days progressively lead to aging of seedlings in the nursery and subsequent reduction of rice yields after transplanting.

Such holidays are uniform throughout the country and are centrally determined by the Ministry of Education. To make Mwea an exception was a serious policy matter. The decision was made easier by the rare coincidence of the general manager of NIB being the brother-in-law of the Permanent Secretary of the Ministry of Education. In the absence of this unique occurrence, it is most unlikely that a favorable decision would have been made or implemented so quickly.

Since 1973, therefore, second-term primary school holidays in Mwea are scheduled to overlap with the transplanting event of mid-August to mid-September. Given the critical nature of transplanting in the rice calendar, the Ministry of Education makes a significant contribution in stabilizing yields and overall project performance.

Ministry of Health

The Ministry of Health maintains a health center, three dispensaries, and a surveillance unit for waterborne diseases within the project. Actual snail and malaria control is, however, carried out by the project management.

Ministry of Cooperative Development

This ministry oversees the operations of the Amalgamated Cooperative Society. In particular, the ministry's representative presides over the election of committee members and occasionally attends the annual general meeting. Occasionally, the ministry can lend its personnel to a cooperative.

The most important service of the ministry is training the cooperative committee members and permanent employees, e.g., secretary, manager, and accountant.

The Churches

From the start of the project, the two main groups of Christian churches (Catholic and Protestant) have shown interest in secular aspects of the Mwea community.

The Protestant churches--through the National Christian Council of Kenya (NCCK)--initiated a rural polytechnic where primary school leavers would acquire skills in masonry, woodwork, tailoring, and horticulture. Later they were involved in the sponsorship of two self-help (harambee) secondary schools. The Catholic mission started the first secondary school and hospital in Mwea.

Some of the church-supported activities have had repercussions far out of proportion from the original effort. In 1973, for instance, the horticultural course at the NCCK-supported village polytechnic led to scattered small-scale vegetable growing on the red soils of the Tebere Block. By 1986, vegetable cultivation (French beans) had bloomed into a multi-million shilling industry that attracted such national exporting firms as Kenya Horticultural Exporters (KHE). Water for vegetable irrigation is derived from drains and is surplus to the needs for rice cultivation.

As a result of vegetable cultivation, young people in the Tebere block have gained employment and have acquired an independence that is rare under Mwea conditions.

Private Firms

A host of private firms have, over the years, found opportunities for doing business at Mwea. Most prominent among these is Barclays Bank, which finances individual farmers' house activities. It does this by granting KSh 5,000 loans to farmers, with no collateral, as long as the project management deducts the repayment installments from rice proceeds and remits them to the bank.

Other private firms include horticultural-export companies, cinema vans, and a wide range of consumer-product firms.

INTERPLAY OF VARIOUS INSTITUTIONS AT MWEA IRRIGATION SCHEME

An Overview

Looking back on Mwea's history, it is fascinating to note how a fairly wide range of institutions, while pursuing their own limited objectives, contributed to the evolution and ultimate success of the project. Let us summarize:

The Ministry of Agriculture conducts research trials on the Nguka Swamps, and unveils opportunities for irrigated-rice production. Almost at the same time, the ministry submits a broadly based proposal on the "Mwea Development and Rehabilitation Scheme," which is accepted by the government. ALDEV, the multipurpose development agency, is charged with implementation of the project.

Simultaneously, the Mau Mau emergency is declared, and the Provincial Administration and the Prisons Department consider Mwea suitable for the

location of seven detention camps, on the basis of its relative isolation. Detainees arrive and have to be rehabilitated through hard labor. Construction of an irrigation project under ALDEV management is timely. The Hydraulic Branch of the Ministry of Works and the Ministry of Agriculture provide specialist inputs in the design and construction of the irrigation system.

As the project enters an operation phase, there is considerable confusion as to which institution is in charge. At a high government level, it is decided to assign the project to the Ministry of Agriculture, and the project is called the Mwea Irrigation Settlement Scheme, with each farmer allocated 1.62 ha (four acres) of irrigated land. Yet other institutions continue their supportive roles. The Provincial Administration chairs the scheme settlement committee, while the Prison Department, though considerably reduced in size, supplies free labor for cleaning main canals and drains. However, new institutions rapidly make an appearance as follows:

--NIB is launched and, though attached to the Ministry of Agriculture, assumes management responsibility for the Mwea project. The Ministry of Agriculture's role is confined to extension services in the nonrice soils and in such specialized services as the quarantine of newly introduced rice varieties, soil survey, and disease and pest diagnosis.

--The police and judiciary departments help the project management in the administration of the irrigation rules.

--The Ministry of Health installs curative and preventive programs for waterborne diseases.

--The Education Ministry supplies teachers to farmer-constructed schools and later makes a decision to reschedule primary-school holidays. This has significant impact on rice production.

--Two farmers nurse the idea of a cooperative, mobilize other farmers, and become chairman and secretary/manager respectively. The cooperative becomes the focus of farmers' self-realization and invests in buildings and vehicles.

--The Cereals and Produce Board offers a ready market for project-farmers' rice at a price annually recorded by the Ministry of Agriculture.

--Private transport companies, which sometimes include farmers, transport rice from fields to the project's reception centers.

--A rice-mill company, owned jointly by the National Irrigation and Cooperative Society, is formed.

--Kenya Power and Lighting Company supplies electricity to the rice mill and later to the two principal commercial centers, the local hospital, and nearby secondary schools.

--From the start of the project, Catholic and Protestant churches engage in both spiritual and temporal activities, such as churches, schools, and hospitals. One such secular activity is the training of sons and daughters of farmers in horticulture, and leads to blooming of a parallel economy almost rivaling the traditional rice production in its importance to individual households. Furthermore, this horticultural subsector, which is based on export produce, attracts a number of private commercial firms who compete for a share of the produce.

--Commercial activity gradually evolves--first at Kimbimbi--near the former project headquarters. With the transfer of project headquarters to Wanguru, the latter eclipses Kimbimbi as the hub of the project's commercial life.

--Donor agencies appear and finance the expansion of the irrigated area and later construction of a bitumen road to the project headquarters, thus opening reliable communication between the project and major towns, including Nairobi.

--Kenya Posts and Telecommunications installs telephone facilities to Wanguru Headquarters and Trading Centers. The project communications system (telephones and roads) becomes integrated with Nairobi and other major towns, thus facilitating the procurement of project inputs (fertilizers, insecticides, and fungicides).

Significantly, the Hydraulic Branch--which made a substantial contribution at the beginning--and its successor, the Ministry of Water Development, assumed no role in the scheme's operational phase. This is in spite of this agency's vigorous water-development programs in the rural areas of Kenya. Thus, until now, the Mwea scheme is one of the few areas in central Kenya where piped water is not available within a short walking distance. This lack of potable water at Mwea perplexes both farmers and visitors alike. A possible explanation lies in the emphasis on production after the Ministry of Agriculture appropriated the project in 1955. The Ministry of Agriculture and its successor, NIB, perceived provision of potable water as a welfare matter that was unrelated to the production function.

Observations Arising from Institutional Interaction at Mwea

As perceived by the administration at the time, the primary objective of the Mwea irrigation project was to settle the landless and thus preempt political agitation arising from overpopulation in the native reserves. Later, the

agriculturalists who took over the project's management conceived the project as an agricultural and economic enterprise.

Both as a settlement and economic entity, Mwea has stood the test of time. For over 30 years since its inception, the project's population has steadily increased. Its economy, based on the transformation of water and other inputs into rice, has been stabilized at a level that compares favorably with other parts of the country. Given the preeminence of the agricultural components, it is tempting to view Mwea as a purely technical phenomenon and thus lose sight of the interactive contribution of a wide range of institutions during the early years and after the project's economy had stabilized.

Unlike recent projects, Mwea never benefited from comprehensive planning, and project implementation was largely on a trial-and-error basis. Hence, institutions were co-opted or created as bottlenecks arose. Expensive errors were committed, but under the prevailing emergency conditions, such errors were easily corrected. It is useful to highlight how various institutions helped to shape Mwea by focusing on the three critical phases of any development project--planning, implementation, and operation and maintenance.

Planning Phase (1948-1953)

As mentioned earlier, there is little evidence of purposeful planning in Mwea, and no single institution can be credited with formulating the project. Rather, Mwea arose from many different agencies. The Ministry of Agriculture prepared the first broadly based "Mwea Development and Rehabilitation Scheme." ALDEV, which was directed to implement the scheme radically changed the original proposals in order to suit the irrigation requirements necessitated by the Mau Mau emergency. In addition, the government--through its provincial

administration--wanted the prospective irrigation development to accommodate landless smallholders. This specification must have loomed large in the conceptual planning of the project by ALDEV.

Experimental activities by the Ministry of Agriculture at Nguka and on the red soil at Wanguru filtered back into the local scheme committee chaired by the provincial administration. Such planning data by the ministry provided the basis for decisions on cropping patterns, field size, and concentration of development efforts on the black soils.

Implementation (Design and Construction--1954-1958)

Implementation derives logically from the planning phase, and--under normal circumstances--is handled by only one or two agencies. This was not so at Mwea.

Engineering designs were executed by the Hydraulic Branch, while the topographical survey was done by Survey of Kenya, both within the Ministry of Works. The soil survey was conducted by the Kenya Soil Survey of the Ministry of Agriculture. Most of the actual construction was done by prison labor under the supervision of ALDEV works supervisors. However, the Ministry of Agriculture did construct some irrigation works on its own.

The overall direction and supervision of the implementation phase was under the provincial administration.

The Operational and Maintenance Phase

It could be considered that the operational phase started in 1960. The Ministry of Agriculture and its successor, the National Irrigation Board (NIB), are the principal actors.

It is evident, however, that even during the operational phase, a wide range of institutions interact with NIB and the farming community at Mwea on a continuing basis.

Until now, the operation and maintenance of Mwea have been narrowly conceived and were limited to the production infrastructure. Development emphasis in Kenya and elsewhere, however, is gradually shifting from physical infrastructure to people and the institutions that serve them. Consequently, it is expected that the role of other institutions that serve the farm community at Mwea will expand, most likely at the expense of NIB.

Key Personalities Who Have Played Decisive Roles in the Evolution of Mwea

Institutions provide the framework within which actions of individuals produce results. Yet individual personalities do react to change these institutions or to produce results that far exceed the limits set by such institutions.

In the case of Mwea, the third manager--E. G. Giglioli--dominated project events and left an imprint that is characteristic of the Mwea model. Displaying a rare combination of analytic intellect and practical insight, he ushered in innovations in the following major areas:

--revised and refined the irrigation rules and had them recorded into law;

--replaced ox-drawn plows with tractor-mounted rotavators for preparing the paddy fields, thus permitting programming of the entire crop calendar; and

--created a staff organization and management structure that linked rewards to field performance. This was effected through a post-harvesting yield analysis where irrigation officers in charge of blocks and field

assistants responsible for irrigation units would participate. Incremental credits or promotions to head field assistant were based on proven performance over a number of years.

Within the third year of his arrival, project paddy yields had increased by about 50 percent, from earlier yields of 3,700 kg per ha. He became a living legend among the farmers and staff and earned the name "Kanyago" (Kikuyu for a long, thin, traditional digging spade), not on account of his physique but because of his immense capacity for action. Giglioli became the first general manager of the new National Irrigation Board in 1966, thus realizing a dream he had entertained during his last three years at Mwea.

The most intriguing question about Giglioli is: Why was he unable to have a similar impact on other NIB schemes such as Hola, Perkerra, Ahero, and Bunyala, since he was the first general manager? The answer is elusive and may lie in the realm of psychology.

However, a number of observations can be made:

(a) Even as general manager of NIB, Giglioli spent disproportionately more time on Mwea (which was comparatively problem free) than all the other schemes. A weekly visit to Mwea was normal, and his preferred mode of travel was by air charter, landing at the nearby Wanguru airstrip. It appears that he neither outgrew Mwea nor his profound attachment to rice. After his departure, the Wanguru airstrip was rarely used.

(b) Having had no major role in molding the two original schemes (Hola and Perkerra), he may have regarded them as illegitimate--or at best adopted--sons and so treated them accordingly.

(c) In spite of his epic achievements at Mwea, there is no available evidence that he ever prepared a manpower-development plan for NIB that was comparable

to Gaitskell's in the Gezira. On the contrary, there are indications that he had difficulties with self-assured, independent-minded individuals, as was shown by the unceremonious departure of the two irrigation specialists (scheme manager and research manager) provided under Italian technical assistance, and the resignations of the first batch of professionally trained Kenyans. Both at Mwea and at NIB headquarters, he apparently valued personal loyalty above individual talent and promise. He had an almost pathological suspicion of university-trained local personnel. When he left NIB in 1972, he expected to be succeeded by his treasured friend who lacked expertise in irrigation or development management. This plan was thwarted by the Ministry of Agriculture when it appointed a former director of agriculture to succeed him. The latter's tenure was shortlived, however, as he died in 1974; but the ministry again appointed the former technical manager of Kenya Tea Development Authority as the third general manager of NIB. It was not until 1978 when the person Giglioli groomed to take his mantle successfully maneuvered to become the fourth general manager. Needless to say, he presided over the "implementation" of the debacle and the deterioration in performance of other schemes.

Regarding the cooperative society, it took the dogged persistence of Stanley Mwaniki and Azariah Muriuki to shake the farmers out of their lethargy. The two became chairman and secretary/manager of the newly formed Mwea Farmers' Savings and Credit Cooperative Society.

It would be interesting to speculate how the Mwea drama would have evolved without individuals like Giglioli, Mwanini, or Muriuki. Most probably Mwea, like the other irrigation schemes within the Tana basin at Ishiara and Hola, would never have achieved significant growth.

Other Favorable Factors behind the Success of Mwea

Physical and Ecological Conditions

In addition to astute management during the early years and the core of supporting institutions, Mwea possesses ideal physical and ecological conditions for growing "Sindano" rice. The heavy clay soils- of volcanic origin -- are inherently fertile, are almost watertight, and ideally retain water within the paddy fields. Irrigation water is reliable, is cheaply extracted from the two rivers arising from nearby Mt. Kenya, and has little silt and few harmful solutes.

Ease of Monitoring and Supervision

The project's relative proximity to Nairobi (about 100 km) has combined with good communication facilities (roads and telephones) to facilitate monitoring and supervision by Nairobi headquarters staff. Remedial action, in case something goes wrong, is usually undertaken promptly.

The Demonstration Effect of Rain-fed Agriculture in the Upper Tana Catchment

When the Mwea irrigation project began, other agrarian innovations were taking place in the wetter upper areas adjoining Mwea. These included land consolidation, soil-conservation measures, and the planting of coffee--and later tea--as cash crops.

The Mwea irrigation farmers could not help but notice the advances being made by their rain-dependent neighbors. It could therefore be expected they [rice farmers] strived to achieve results comparable to their rain-dependent counterparts.

CONTRASTING MWEA WITH OTHER IRRIGATION DEVELOPMENTS WITHIN THE TANA BASIN

Hola Irrigation Scheme

Hola was started at approximately the same time as Mwea and with similar objectives--providing occupation for Mau Mau detainees and settlement opportunites for the landless. The performance of Hola Irrigation Scheme, however, has been erratic, and is one of the schemes operated by NIB that must receive subsidy from the treasury. While cotton yields of 3,000 kg per ha are possible, performance often falls below this figure and may fluctuate between 2,000 and 2,500 kg/ha. Table 3 illustrates how the Hola Irrigation Scheme compared to the Mwea Scheme in terms of overall performance.

Table 3

Mwea and Hola Irrigation Schemes
A Comparison

Item	Mwea (rice) 1965/66	82/83	85/86	Hola (cotton) 1965/66	82/83	85/86
Cropped area (ha)	2,593	5,784	8,271*	449	782	860
No. of farmers	1,484	3,151	3,234	276	605	661
No. of project staff	N/A	328	320	N/A	185	176
Mean payout per farmer (KSh)	2,549	11,348	9,017	1,943	3,728	3,799
Share of payout as percentage of gross value of crops	59.4%	50.2%	34.6%	62.0%	40.6%	27.3%

*Double cropping

The reasons behind this rather poor performance are:

--Water is pumped from the Tana River and, in the absence of good backup supplies of spare parts, the pumps occasionally fail--thus affecting water supplies and cotton yields.

--The Cotton Marketing Board provides a marketing outlet, but is unable to pay the farmers until six to twelve months after crop delivery. Inevitably, farmers experience major cash-flow problems and are often demoralized.

--Hola lacks agricultural and other social and economic activities that could stimulate farmers to undertake desirable initiatives. For instance, after much persuasion, farmers at Hola formed a cooperative that virtually collapsed after two or three years of operation in handling cotton purchases on behalf of the cotton board. The cooperative at Hola has played only a minor role in mobilizing farmers' savings or in issuing credit facilities to its members.

--Hola also lacks the panoply of institutions found at Mwea, particularly the churches and private-sector agencies. The tenant communities have lacked the dynamism exhibited by the Mwea tenants and completely resigned themselves to their status as quasi employees of NIB.

Lower Tana Small-scale Irrigation Program

From time immemorial, the riverine communities of the Pokomo have practiced irrigation based on seasonal flooding of the Tana River. During the mid-1960s, however, there were security problems on the east bank of the river, which resulted in the abandonment of flood-based irrigation activities on that side of the river. In partial response to the ensuing food shortage, NCCK and

later FAO initiated village-based pumped-irrigation schemes on the western bank of the river. These pumped-irrigation schemes, however, have had a history of poor performance for reasons ranging from pump breakdown to unlevel fields.

With financial and technical assistance from the Netherlands government and the World Bank, the Kenyan government launched a "Lower Tana Village Irrigation Program" with the aim of rehabilitating the following five schemes:

Scheme	Area (ha)
Mnazini	37.6
Hewani	32.4
Wema	58.3
Ngao	65.0
Oda	20.0
Total	213.3

A total of KSh 35,386,500 was budgeted for the rehabilitation exercise, which would feature improvement of the water-delivery system and provide extension services for irrigated cultivation of rice and maize. However, the cost of the program has proved to be expensive (at an all-in cost of KSh 380,000/ha), and is comparable to Bura. Farmers have also not been quick to adopt sound rice-husbandry practices, and apart from Hewani--where there is a full-time NCCK extension agent--rice yields are less than three tons per hectare.

The number and types of project buildings, vehicles, and machinery appear to be out of proportion to the size of the task (213.1 ha), while the staff is top-heavy (at one time there were seven expatriate personnel and 25 Kenyan staff). These two factors might have contributed to the high rehabilitation cost. This has led to the withdrawal of support from both the World Bank and

the Netherlands government after the initial budget was exhausted, with only three schemes (Hewani, Wema, and Mnazini) rehabilitated.

On close inspection, however, it appears that the rehabilitation program was perceived purely as an engineering exercise, with little consideration given to the improvement of rice varieties, motivation of prospective farmers, provision of marketing outlets, or general extension services. The rehabilitation program was also based on a misplaced premise that the lower Tana is a food-deficit area. There is reason to believe that food deficits or famine are rare in this area, since the local population has access to the less demanding flood irrigation. Moreover, fruits (mangoes and bananas), fish, and crocodile meat are readily available.

Indications are that the initial enthusiasm of NCCK to start irrigation activities along the lower Tana may have been motivated by the challenge of the Muslim religion, which is dominant in the Coast Province of Kenya. The irrigation schemes provided a convenient alibi for intervention on this part of the coast. The prevailing security problems necessitated the movement of ethnic Pokomo to the western riverbank, and this disrupted flood-based irrigation and food production. This gave even more justification to the pump-based projects.

With the pacification of the area during the mid-1970s, traditional flood-based irrigation was fully reestablished. This being the case, the local community desired neither resettlement nor pumped-irrigation schemes. Hence they did demonstrate enthusiasm for the rehabilitation program funded by the World Bank and Dutch government.

However, their traditional flood-based irrigation activities have been threatened from a different angle. Since 1965, there has been an ongoing program of constructing hydropower stations in the upper catchment to the

present level of five major power stations. Three of these have considerable capacity for river regulation. The effect downstream is that flood levels do not reach as high a point as before. Even if the variation in peak flood levels is modest, the consequences on flood areas and flood depths could have far-reaching effects on both the irrigated area and the crop yields in the traditional agricultural economy of the lower Tana. Agencies upstream (Kenya Power and Lighting Company and Tana River Development Authority) that engage in river-based activities to achieve national benefits are likely to attain these at the cost of losing flood-based agricultural benefits in the lower Tana. A mechanism for reconciling these conflicting water demands is clearly indicated.

Bura Irrigation Project

Between 1971 and 1975, there was considerable interest in lower Tana irrigation development with a focus on the Bura Irrigation Project. It was first perceived as a 14,000-ha project, but was later reduced to 6,700 ha. Work on the 6,700-ha project was approved by the World Bank and other co-financiers (Government of Kenya, The Netherlands, EEC, and United Kingdom). By 1984 it became clear that the original 6,700 ha was already developed. The main reasons behind this decision were the high cost of development (over KSh 400,000 per ha), innumerable operational problems (it was based on a temporary pumping station), lack of competent management support, rapid deterioration of farmers' houses, and resulting low farmer morale. The project now depends on the treasury for subsidizing its operational account and is not expected to break even in the near future.

It would be interesting to contrast the implementation methodologies between Mwea and Bura. Project implementation at Mwea was taking place under

the highly charged atmosphere of the emergency, at least during the initial stages. Later, the second and third phases of Mwea were implemented by NIB, mainly using its own personnel for carrying out field surveys, digging field channels, and supervising field leveling. Only the actual level terracing was let out to a Kenyan contractor. In contrast, Bura was handled as an international project with a horde of expatriate experts, consultants, contractors, and interest groups. Little attempt was made to use the experience gained at Mwea or other existing projects operated by NIB in implementing Bura project activities. During the heyday of Bura construction, there were privately chartered flights--two each day--operating from Wilson Airport in Nairobi West.

Farmers were recruited from all over the country, arrived at Bura, and were allocated completed houses and prepared fields. This is in contrast to the Mwea situation, where upon their arrival at the scheme farmers were required to engage in the construction of their houses and also in the digging of the field channels. The practice at Mwea, therefore, gave the farmers a more intimate understanding of the environment in which they were expected to operate. The farmers arrived in Bura with everything complete, increasing their feelings of alienation, especially after receiving copies of the irrigation rules that were distributed when they arrived. The Bura story is still unfolding, but even with its limitations, the Mwea project offered lessons that could have steered Bura away from trouble.

With the knowledge of hindsight, Bura may represent how not go about an irrigation project. First, no systematic attempt was made to learn and digest lessons arising from existing irrigation projects run by NIB. Similarly, there was no attempt to utilize local personnel who have been associated with irrigation development in Kenya during the last twenty years. The project was

formulated by foreign consultants, appraised by World Bank experts, and largely implemented by a firm of overseas contractors. Even such mundane aspects of the project as the construction of farmhouses had to be entrusted to someone without previous experience. This is in spite of the fact that farmhouses have been constructed in Mwea--and in all other NIB schemes in Western Kenya--for the last twenty years. It would have been sensible to transfer personnel of the Building, Maintenance, and Construction (BMC) from Mwea to Bura and use their extensive knowledge and competence.

Kibirigwe Irrigation Scheme

This 120-ha irrigation project represents a relatively new approach to irrigation development in the Tana basin. Unlike Mwea or Hola, the project has no settlement component, and aims at superimposing an irrigation infrastructure on existing settlement patterns and freehold land rights. Each of the 300 farmers irrigate 0.4 ha from an average holding of 2.0 ha. Hence the total net irrigated area amounts to 120 ha, with horticulture (such as tomatoes and onions) as the main production lines.

A number of institutions were behind the project's initiation. First was the Tana River Development Authority, which identified and formulated the project as a gravity-fed sprinkler system. On the recommendation of the Tana and Athi Rivers Development Authority, the Ministry of Agriculture assumed implementation and operation responsibilities with the financial and technical assistance of the Dutch government. There was, however, some initial reluctance by prospective farmers as they feared either loss of land to the government or change of their tenure status to that of tenants. In a number of

meetings in the project area, the provincial administration managed to allay their fears.

Implementation started in 1977 and ended in 1981. As provided in the original plan, the Ministry of Agriculture was expected to gradually devolve a number of responsiblities to the participating farmers through their cooperative society. In this regard, the Ministry of Cooperative Development assisted the participating farmers in organizing the Kibirigwe Farmers' Cooperative Society.

Since 1983, the farmers' cooperative has assumed a number of responsibilities pertaining to marketing, input procurement, and processing of farmer accounts. The Cooperative management committee is largely responsible for the management function of the project. The Ministry of Agriculture still maintains a skeleton staff of project comanager, project engineer, horticultural officer, and five field assistants. The role of the agricultural ministry is now purely advisory, particularly on such aspects as crop planning, disease control, and irrigation scheduling.

Although there was a significant drop in total production performance between 1983 and 1985, yield performance has now stabilized; and the cooperative is steadily acquiring skills and confidence in coping with the volatile horticultural market.

Visual evidence of the impact of the scheme, which has been in existence for no more than nine years, is evident in the expansion of the local trading center at Kibingoti. Shopping centers, grocery stalls (kiosks), the sprawling open-air market, and even a combined bar and night club all attest to the economic spillovers emanating from the irrigation project.

Kangocho Irrigation (Water Association) Project

The history of the Kangocho Irrigation Project dates back to the time of World War II. As part of the war effort, the colonial government forcibly took land in the Kangocho area for the irrigated cultivation of vegetables (cabbages and carrots). These were taken to the nearby factory at Karatina and, after drying, transported to the war front in Ethiopia and Somalia. The deep, friable soils and easily diverted clean water of the Ragati River made Kangocho an ideal area for the project.

After the war, vegetable cultivation stopped and the land reverted to its previous owners. The irrigation facilities (intakes and canal system) fell into disuse until the early 1970s, when the local people decided to resume irrigated cultivation of vegetables.

On their own initiative, the local people formed a water association for the purpose of obtaining water rights from the Ministry of Water Development. The committee has a chairman, secretary, treasurer, and five committee members. Through its chairman, the committee organizes about 150 farmers who comprise the membership of the association in construction or maintenance work of the irrigation system. The committee and canal-branch leaders are responsible for water allocation and scheduling. Any unauthorized water use can lead to the denial of irrigation water for the season in question, and if such behavior persists, the farmer involved may be expelled from the water association.

The procurement of inputs and spraying equipment is done on an individual basis, since these are easily available in the nearby center of Karatina, three kilometers away. Marketing is also handled individually, and each farmer takes his crop of tomatoes, cabbages, or carrots to the Karatina wholesale market or

hires a truck to take them to Nairobi. Occasionally, two farmers may band together and hire one truck to transport the produce, sharing the cost.

The farmers tend to be relatively young--20 to 45 years old--and acquire necessary horticulture skills through reading and discussing among themselves. So far, the Ministry of Agriculture's extension services have provided little technical backup. An exception to this is the recent material and technical support in designing the new intake and the necessary financial support from the Provincial Irrigation Unit. Even in this instance, the farmers had to provide the necessary labor and additional construction materials.

Island Farm (Kimahuri) Water Project

In 1964, about 300 landless people were settled on Island Farm, which was previously owned by an English settler. This exercise was part of the post-independence one-million-acre settlement program--where African small-scale farmers were to replace the departing large-scale colonial settlers.

The newly settled farmers were each allocated seven to ten acres of land and were expected to practice a mixed farming system featuring both crops and dairy cattle. Being located on the slopes of Mt. Kenya, Island Farm has relatively high rainfall (over 800 mm), and crop production poses no major problems. Water for livestock was not easy to find, however, as the river was a considerable distance from the main concentration of settler holdings.

One of the new settlers, Mr. Kariuki Garamu, conceived the idea of diverting water from the river and gravitating it via an open canal to the fields. Gatamu had worked in former large-scale farms as a laborer, plumber, mason, and general construction technician. He had also seen service during World War II in Ethiopia, Burma, and India; and commanded considerable respect

in the community. Consequently, he was able to mobilize 267 farmers in the excavation of the canal, erection of a wooden intake structure, and installation of water-distribution boxes. Meanwhile, the farmers organized themselves into a water association with a chairman, vice chairman, secretary, treasurer, and 13 committee members who represented five branches of the main canal. Water was delivered by pipes from the branch canals to individual holdings.

At first, water was used for domestic and livestock requirements only. It soon became clear, however, that the water could be used for irrigating vegetables during the dry periods from January to March and from August to September. Thereafter, irrigation quickly expanded to become the principal water use in the area. Strict control of water use was imposed by the committee, including restriction of the diameter of offtake pipes to two inches. Formal arrangements for maintenance of the intake and the main and branch canals were made by the project committee. The project expanded from the initial 267 members to its present level--estimated at 500 members--making water allocation and management even more difficult.

All participating farmers are expected to observe the project rules regarding the extraction of water. Any infringement of water (e.g., installing an extraction pipe larger than two inches, drawing water when not scheduled for it, or failing to contribute one's share of labor during the communal clearing of the intake or canals) may lead to suspension from the project for a season or the whole year. It is understood that very few farmers dare to flout the rules.

DRAWING NECESSARY LESSONS

The preceeding section examined a range of irrigation developments that differ in their histories, physical attributes, and management styles. Nevertheless, they have something in common--they all attempt to use the waters of the Tana River for irrigated production. The results have varied widely, and it would be useful to explore the general lessons that could be drawn and used in the design of other irrigation projects within the Tana basin or in other basins in Kenya or elsewhere in Africa. In particular, these lessons are likely to embrace the following aspects:

The Role of Institutions and their Interaction

Irrigation production is more likely to succeed if supported by a number of institutions. In Mwea, for example, no fewer than ten institutions interact to stabilize project results. Lack of such widely based institutional framework may partly explain the lackluster performances at Hola, Bura, and the Lower Tana Village Irrigation Program.

It seems that institutional analysis is necessary as part of development planning for an individual project or for a group of projects within a river basin. Such an exercise will help to highlight possible interactions (both positive and negative) among agencies. Hence, the planning effort will attempt to maximize the desirable interactions and minimize the negative ones.

A focus on institutions during the planning stage will also pay unforeseen dividends. It will permit a project or a development program to be seen in an organic as well as dynamic perspective. In turn, this will reveal a vast maze of hidden costs and benefits, which is a far cry from the engineers' bill of quantities or the economists' magic flutter of IRR (internal rate of return).

Without expecting an exact depiction of the future, a rigorous institutional analysis should explore who is likely to do what--and when--and attempt to define the cost of inaction in terms of project performance.

In the case of Bura in the lower Tana, it was patently clear that NIB lacked the institutional capacity to handle the project. Consequently, the World Bank made as a condition for its loan that NIB engage a team of management consultants to implement and operate the project. The more demanding alternative--insisting that NIB demonstrate its ability to develop and deploy a local implementation team--was not pursued. NIB acted as required and, in the heat of the implementation period, regarded internal institutional review as an irrelevant luxury.

Impact of Key Personalities in Project Evolution

Most projects tend to make not only radical changes in the physical environment (such as river diversion or land alteration), but also demand substantial cultural adjustments from the project participants (project managers, workers, and farmers). During the initial stages, the project proposal is merely a plan that may only be realized by the skillful mobilization of a wide admixture of resources (people, funds, and machinery).

The probability for the successful execution of a project is enhanced if the key person (by selection or through volunteering) entrusted with its implementation has acquired a relish for "doing battle" and getting results. To some, such a relish comes naturally, but to most it is acquired gradually through fighting and winning minor skirmishes. In the case of Mwea, Giglioli was already battled-hardened at the age of 39, and had participated in mechanized rice-production schemes in British Guyana. Mwea, therefore, gave him a

unique opportunity to prove himself. Similarly, at Island Farm, Kariuki Gatamu was in his fifties--with a track record of carpentry, plumbing, and masonry -- when he led the new settlers to divert water for livestock and later for irrigation.

The story of Hola in the lower Tana is one of managers with few of the technical and managerial insights of Giglioli. In the same part of the basin, Bura was also implemented without any such firebrand. As one expatriate expert once commented, "You have to realize that Bura is an extraordinary scheme, located at the middle of nowhere, no facilities. . ." Perhaps he could have added that at that time Bura needed an extraordinary personality--not a run-of-the-mill civil servant--to oversee its implementation.

Use of Smallholder Creative Impulse

Young horticultural irrigators at Mwea, members of Kangocho Water Association, and small-scale settlers at Island Farm clearly demonstrate the ability of peasant farmers to take advantage of economic opportunities. It is true that with their narrow resource base, they have a tendency to be conservative and averse to taking risks. However, when a market is available and production is within their grasp, they can engage in creative initiatives. After all, they are human.

The Role of Government in Smallholder Irrigation Development

Governments can invest directly in irrigation-based agroindustrial ventures when financial, labor, and management resources can be bought or hired. The methodologies of implementing such corporate ventures are well documented in management and corporate literature, and are not of interest to us here. We

are more concerned about the role the government can play in stimulating smallholder farmers to manage water and land resources to produce crops on a sustainable basis.

As shown in the case studies reviewed, three categories of government involvement with smallholder-irrigation development may be distinguished as follows:

1. Continued Direct Intervention--This is exemplified by Mwea, where the government, through NIB, determines key project events such as water allocation, cultivation, input procurement, and marketing. In addition, the government has legal instruments for controlling farmer behavior.

2. Sustained Support--The Kibirigwe project illustrates this category, which is characterized by the government providing technical services on a full-time basis. The farmers are in charge of major project acitivities. However, a complement of government technical personnel continuously provide guidance on cropping and marketing. There are two main platforms for resolving major issues relating to the project--the Kibirigwe Project Steering Committee, which brings farmers and government representatives together, and the Kibirigwe Farmers' Cooperative Society.

3. Support on a Need Basis--This category is represented by Kangocho and Island Farm. In this instance, the farmers define what they want and, on this basis, request the necessary assistance from the government.

Members of Kangocho Water Association, for example, wanted a proper water-intake structure, and approached the government for technical and material assistance for its construction. After installation of the intake, the members were content to resume managing their own affairs.

Preferred Mode of Government Intervention

The imperatives of irrigated production require strict procedures for water allocation and maintenance of water-distribution systems. The necessary discipline can be provided by an external authority such as NIB in the case of Mwea, or may be generated internally by the participating members themselves -- as is the case at Kangocho and Island Farm.

The extent of government intervention will be influenced by:

--its operational ideology (does it believe farmers can be entrusted with the apparently complex task of managing an irrigated production system?);

--the availability of government technical and management personnel; and

--donor agencies' preferences.

Where development is perceived in human terms (i.e., a process by which people acquire the skills and courage to relate to their material environment for production of goods and services they want on a sustained basis), then the first category--as exemplified by Mwea--is untenable. This is because this mode of government intervention permits little scope for farmers (or their sons and daughters) to gain knowledge and wisdom for managing the resources around them. Indeed, the Mwea model is increasingly being challenged, and although NIB is likely to continue, it will probably not develop any new irrigation projects. Indeed, NIB is presently being challenged by the Ministry of Agriculture and the newly established regional development authorities--such as the

Tana and Athi Rivers Development Authority (TARDA). These agencies are planning new projects that permit considerable farmer participation (Ministry of Agriculture) or provide for an agroindustrial venture (TARDA).

Within the Kenyan context, the new emphasis on local participation suggests a greater involvement of the district development committee on Mwea and, by implication, a loosening of control by NIB headquarters in Nairobi. The district-focus strategy is still at an experimental stage, however, and it is not clear how soon Mwea farmers will acquire more responsibility in running the scheme. Since Mwea produces more than two-thirds of Kenya's rice requirements, the government would be reluctant to risk production performance in such a strategic scheme.

The first and second categories appear to be favored by the Ministry of Agriculture and some donor agencies, and it is expected that future government intervention in smallholder irrigation development will fall under these two categories. More specifically, it will be expected to provide the following specialized functions:

--planning and engineering designs;

--construction of irrigation infrastructure with farmer participation such as in canal excavation or masonry work;

--farmer training, including demonstration plots;

--advice on crop planning and the procurement of necessary inputs;

--market intelligence; and

--farmer credit.

This role perception would obviate instances where the government has suffocated the farmers' initiative by attempting to do everything.

Donor Agencies and Technical Assistance

The old irrigation schemes (Mwea and Hola) were implemented in order to meet a local objective--to generate labor for detainees and settle the landless.

Since the mid-1960s, donor agencies have promoted irrigation activities largely because they are visible and lend themselves more easily for description as "projects." The Bura, Kibirigwe, and Lower Tana Village irrigation projects are such examples. Experience within the Tana Basin and elsewhere has, however, produced mixed feelings about the nature of involvement by donor agencies.

In some instances, the donor agencies have ridden roughshod over their Kenyan counterparts and implemented projects to their own liking, such as Bura in the lower Tana and Mitunguu in upper Tana. The net result of such a donor style is that after the withdrawal of expatriate personnel, there is little local staff with both a sense of history and managerial insight to handle the project. This happens in spite of a clause--found in nearly all technical cooperation documents--that mentions "institution building and manpower development" as primary objectives of the project.

It may be useful to articulate a set of evaluation criteria applicable to technical cooperation programs (TCPs) that could include the following:

--A TCP can only be judged successful if there is a local cadre to manage the project when it is completed.

--No TCP should be initiated unless the recipient country demonstrates its bona fides by deploying local participants who have the basic training and inclination to benefit from the TCP.

--In the selection of expatriate personnel to participate in a TCP, preference should be given to seasoned professionals with the patience to pass their expertise to others. Such individuals would be willing and eager to perpetuate personal success in the success of the local counterparts. Individuals who would not grant authority to their local counterparts should not be selected. Mitunguu is a case in point.

Difficulties attending TCPs in irrigation development must, however, be seen within a wider context. The perception of a TCP's function varies with the main actors. To the senior local bureaucrat, TCP offers an opportunity for a new official car or office; to the overseas consultant and contractor, a chance for a lucrative contract; and to the local businessman, a rare opportunity to do business. The farmers and their future needs too often become secondary.

THE FUTURE DIRECTION OF IRRIGATION DEVELOPMENT WITHIN THE TANA BASIN AND ELSEWHERE IN KENYA

The Need for Institutional Review

Currently only about 33,000 ha--out of an estimated potential of 540,000 ha--is under irrigation in Kenya. NIB accounts for some 8,700 ha, or 27 percent of the total irrigated area. At the same time, the Tana--the largest river in Kenya--can sustain 200,000 ha, or 37 percent of the total potential.

After the traumatic experience of Bura, irrigation development is at a crossroads--on one hand, the government is reluctant to engage in other extensive irrigation ventures. On the other hand, three regional irrigation authorities have been launched during the last ten years with a mandate to plan and sometimes develop land and water resources. A fourth development authority is contemplated. All of the authorities have prepared ambitious programs

for irrigation development either with farmer participation or as corporate ventures. Simultaneously, the Ministry of Agriculture and the Ministry of Water Development are expanding their ongoing smallholder irrigation projects. As if this is not sufficient, a host of nongovernmental organizations (NGOs) with external financing are eager to implement small-scale irrigation activities in the semiarid zones of the country.

Understandably, the government is somewhat concerned about what direction irrigation should take in the coming decades. However, for irrigation to make an enduring contribution to Kenya's economy, an overhaul of the existing institutional framework for irrigation development and management will be necessary.

Creation of a Single Irrigation Agency

This implies amalgamation of NIB with irrigation branches of the Ministries of Agriculture and Water Development. Such a single "National Irrigation Agency" would abolish the artificial division between small-scale and large-scale irrigation, and result in the following advantages:

--better utilization of staff and machinery;

--more rational planning of irrigation-water resources;

--coordinated expansion of irrigation development; and

--better harmonization of negotiation with donor agencies.

The new organization would provide a forum for resolving such inequities as the payment by Mwea farmers of a service charge of KSh 2017 per ha, while similar farmers at Kibirigwe pay nothing.

Role of the District Development Committee (DDC) and Farmer Organizations

Development is increasingly being viewed in Kenya as an essentially local affair, and the government has entrusted the district development committee (DDC), which is chaired by the provincial administration, with overseeing all major development activities--whether sponsored by the government or by NGOs. This being the case, an enhanced role for irrigation-scheme committees, water associations, or cooperatives is foreseen. By the same token, a less direct involvement by government or donor agencies can be expected.

The present technical base of most farmer organizations is fragile. It will be necessary for a period--perhaps five years--for farmer training and the progressive devolution of responsibilities from government or donor personnel. Kibirigwe has demonstrated that this is feasible as long as goodwill exists between the government/donor personnel and the farmers. The guiding principle of this farmer support is that the farmer should be self-sufficient as soon as possible. This should be the standard of success of government/ donor staff involved in such an exercise.

Donor Finance and Expatriate Technical Experts

In a number of cases, it is the availability of donor finance that has determined whether or not the project is accorded priority. This "push factor" has often led to a distorted view of the irrigation project, both by the expatriate personnel who are inevitably part of the donor's finance package and by the local counterparts.

The expatriate personnel who control critical project resources (such as finance and vehicles) are likely to perceive the project as theirs and quickly crowd the locals out of the scene. This was true in Bura, lower Tana, and--to

a lesser degree--Kibirigwe. The local counterparts often become alienated from the project, and may abdicate altogether. Of course, this was not intended in the original project document. Perhaps the relationship between the government staff and the farmers could be applied to donor and local staff; the most important measure of expatriate-staff success should be the degree of competence with which the local individuals can handle the project.

Environmental Issues

At this time, the main promoters of irrigation development concentrate primarily on the engineering and agronomic dimensions of irrigation projects. This is an especially significant problem for small-scale projects. Under a unified irrigation administration, it is possible to charge a small unit with such environmental aspects as potable-water supplies and bilharzia and mosquito control, either on its own or in conjunction with the Ministries of Health and Water Development.

In regard to social and environmental matters, Mwea has performed poorly. Bilharzia and mosquito control is undertaken by NIB, but its efficacy is considered low by the surveillance team of the Ministry of Health. Farmers have no potable water, in sharp contrast to Kibirigwe, where the government ensured that treated water was incorporated into the project design. This is another reason for placing all irrigation projects under the same administration.

Project Relationships with the Outside World

The relationship between an irrigation project and the outside world is largely a function of its history. Mwea, Hola, and--until recently--Bura, are governed by the irrigation rules because they were promoted by NIB. These

rules regulate the farmers' relationships with the land, water, time, officials, and even with people outside the scheme. This is not so in small-scale projects, such as Kibirigwe, which is sponsored by the Irrigation and Drainage Branch of the Ministry of Agriculture. The latter projects are integrated with the rest of the community, and farmers are otherwise ordinary citizens subject to standard Kenyan laws--no more.

In the NIB projects, farmers can only respond (normally by complying) to initiatives from the outside, and do not have an opportunity to modify them. For instance, although double cropping at Mwea has little merit at the national or farmer level (both total scheme rice yield and average farmer income were lower), farmers were coerced into compliance by NIB management and the provincial administration. The double-cropping incident is the greatest crisis ever to face the scheme and, in a sense, the farmers used the occasion to "test the water." They went on strike, wishing to see if an independent African government would be more accommodating to their preferences. They were shocked by the extent and swiftness of reaction by the provincial administration on behalf of NIB. The old farmers who came to Mwea as detainees in 1955 must have considered the situation as one of déjà vu. For the young farmers who were unfamiliar with the scheme's rather grim origins, the experience was traumatic.

Overall Planning and Coordination of Development Activities within the Tana Basin

A number of agencies are presently involved in river-based development within the Tana basin, the principal ones being:

--Ministry of Agriculture

--National Irrigation Board

--Ministry of Water Development

--Kenya Power and Lighting Company

--Ministry of Livestock Development

--Tana and Athi Rivers Development Authority

When the Tana and Athi Rivers Development Authority (TARDA) was formed in 1974, its principal mandate was to prepare long-range plans and coordinate development within the Tana River basin. Now it is prepared to engage in activities that compromise its competence to arbitrate land and water use within the basin. For instance, it plans to initiate an agroindustrial project involving 16,000 ha in rice irrigation at the Tana delta area using Japanese finance and technology. This project will wipe out dry-season grazing land for the nomadic Orma, who seasonally herd an estimated 200,000 head of cattle in the delta area. Similarly, the existing Lower Tana Village Irrigation Program and traditional flood-based irrigation activities will be in jeopardy, either because of direct annexation or deprivation of labor by the new project.

In addition, the Authority's dam-construction works in the upper Tana catchment are likely to have major repercussions in the economy of the lower Tana reach. In an ongoing morphological study of the Tana River, a simulation model has indicated that present and planned dam structures could significantly reduce peak floods and thus result in:

--considerable decline in flood-based irrigation, necessitating continual famine-relief supplies to the local population;

--reduction in the availability of forage in the delta area and the basin lands lying below the levee lands;

--marked shift in the riverbed, leaving existing pumping stations high and dry;

--reduction in the silt load reaching the sea, causing decline in estuarine fishery life, particularly the crustaceans; and

--gradual decline of floodplain forests, with dire consequences for future firewood availability for the riverine population.

In view of these factors, questions are being asked of how TARDA could engage in limited intervention and yet retain credibility as an honest broker. Apparently, it can attain an objective overview of the basin only by concentrating on overall planning and then assigning executive responsibility to other agencies (government or NGO). This will permit TARDA to be more rigorous, and at times ruthless in its pursuit of an optimum development program. Were this the case, it could let NIB or the Ministry of Agriculture take the irrigation component, while the Kenya Power and Lighting Company assumes construction of hydropower projects, as it did until 1977.

Appendix I

Present Agencies Involved in River Development in the Tana Basin

Agency	Nature of Involvement
1. Ministry of Water Development	a. Licensing of all water abstractions or diversions for irrigation, hydropower, and urban, domestic, and livestock water supplies b. Water resources planning (National Water Master Plan c. Water resources development (urban and rural water supplies, irrigation, and drainage
2. Ministry of Agriculture	a. Irrigated agricultural research and soil survey b. Promotion of small-scale irrigation (Kibirigwe, Mitunguu, Lower Tana)
3. National Irrigation Board	a. Construction of irrigation infrastructure b. Settlement of tenant farmers c. Management of irrigated agricultural production
4. Tana and Athi River Development Authority (TARDA)	a. Long-range planning of land and water resources b. Construction of regulation or hydropower dams c. Construction of irrigation infrastructure (Kibwezi, Tana delta) d. Management of irrigated agricultural production

Agency	Nature of Involvement
5. Kenya Power and Lighting Company	a. Long-term planning of electric power demands b. Construction of hydro and other power stations c. Generation of power from hydropower and other installations d. Distribution and marketing of electric power
6. Rural Households	a. Domestic water use either by direct withdrawal or through pumped or gravity delivery b. Direct watering of livestock c. Small-scale irrigation by watering can or by using permanently moist valley bottoms d. Flood irrigation, particularly in the lower Tana e. Small-scale pumped irrigation along the river system (upper and lower Tana) f. Small-scale gravity irrigation (upper Tana only)
7. Private large-scale firms	a. Construction of industrial or irrigation infrastructure b. Management of irrigated agricultural production and/or agroindustrial manufacture (Kenya Canners, coffee estates)
8. Funding Agencies (World Bank, KFW, USAID, NGOs)	Financing of operations of above agencies

Appendix II

Tana River Basin: Institutional Analysis

Time Sequence	Institutions	Mandates	Actions Organizational	Actions Operational	Problems	Unplanned Events	Linking Institutions
1900-20	Households	Food security	Neighborhood work groups	Agriculture grazing			
	British colonial government	Law and order European settlement	Organizing Provincial Administration and other gov't	Demarcation of all land into alienated and non-alienated departments			Colonial Office, London
1920-40	Households	Food security			Land shortage		
	British colonial government	Post-war European settlement	Board of European settlement	Settlement of upper Tana			Colonial office, London
	Ministry of Agriculture	Promotion of agri. in European settlements	Extension meetings	Agricultural experiments			
1940-50	Households	Food security	Political parties	Political agitation			
	British colonial government	Law and order	Declaration of emergency suspects	Detention of Mau Mau	Location of detention camps		Colonial office, London
	Ministry of Agriculture	Promotion of agric. in European and African areas	Research stations in European and African areas	Research programs			Provincial Administration
	ALDEV	Land rehabitation	ALDEV Board meetings	Soil conservation			Ministry of Agriculture

Tana River Basin: Institutional Analysis continued

Time Sequence	Institutions	Mandates	Actions Organizational	Actions Operational	Problems	Unplanned Events	Linking Institutions
1950-60	British colonial government	Law and Order	Emergency declaration	Widespread detention	Location of detention camps		Colonial office, London
	ALDEV	Irrigation development	Works supervisory team	Irrigation development		Role diminished	
	Ministry of Agriculture	Promotion of agric.	Research stations	Agric. experiments		Left in charge of irrigation	
	Ministry of Works	Design and const. of road, building, water works	Design and const. units	Design Mwea irri. works	Who was accountable for const. works?	Withdrew from irrig. activities	
	Prisons Department	Custody of prisoners					
1960-65	Indep. Kenya government	Economic development	Reorganization of civil svc setting of subsidiary power dev. companies				
	East African Power and Lighting Co.	Electric power development		Construction of Kindaruma Dam			
	NIB	Development of national irrig. schemes	Absorbs three irrigation schemes	Expansion program at Mwea and W. Kenya			FAO

Tana River Basin: Institutional Analysis continued

Time Sequence	Institutions	Mandates	Actions Organizational	Actions Operational	Problems	Unplanned Events	Linking Institutions
1965-75	NIB	Irrigation development					
	TARDA	Land and water planning					
	Overseas consultants	Planning					
	Overseas contractors	Construction					
	Bilateral aid agencies	Funding					
	World Bank	Funding					
1975-85	NIB	Irrigation development	Bura Office	Implementation of Bura	Costs high	Bura management removed	Ministry of Agriculture, donor agency, & consultants
	TARDA	Land and water planning	Basin planning teams	Construction of Masinga & Kibwezi irrigation scheme planned Mitunguu & Kiambere			
	Ministry of Agriculture	Promotion of agri. including irrigation	Provisional Irrigation Units in lower & upper Tana	Lower Tana irrigation program Kibirigwe project	Costs high; lack of staff	Assumes direct responsibility for Bura	Donor agencies & consultants
	Kenya Power and Lighting Company	Power generation and distribution				Succeed the former E. Afr. Power and Lighting Co.	

Tana River Basin: Institutional Analysis continued

Time Sequence	Institutions	Mandates	Actions Organizational	Actions Operational	Problems	Unplanned Events	Linking Institutions
1975-85 (cont'd)	Ministry of Water Development	Water development		Rural water supplies & irrigation	Overlap with other agencies		Donor agencies & consultants
	DDC	Coordination of district development	DDC meeting	tender evaluation monitoring	still experimental		All government and NGO agencies
	NGO	Economic and social development	Field teams	Irrigation and rural water supplies	Overlap with other agencies		Overseas NGOs & donor agencies

Appendix III

National Irrigation Board

Irrigation Rules

Government of Kenya

LEGAL NOTICE No. 535 *(LND. 1/2/2/3)*

THE TRUST LAND ORDINANCE
(Cap. 100)

IN EXERCISE of the powers conferred by section 64 of the Trust Land Ordinance, the Governor, with the advice and consent of the Trust Land Board hereby makes the following Rules:–

THE TRUST LAND (IRRIGATION AREAS) RULES, 1962

1. These Rules may be cited as the Trust Land (Irrigation Areas) Rules, 1962, and shall apply to such areas of the Special Areas as the Minister may, by notice in the Gazette, declare to be irrigation areas.

2. In these Rules, unless the context otherwise requires–

"African court" means the African court having jurisdiction in the area;

"area" means any irrigation area declared under the provisions of rule 1 of these Rules:

"authorized dependant" means in relation to a licensee, his father and mother, wives and such of his children as are unmarried and under the age of 18 years;

"committee" means an irrigation committee appointed under rule 3 of these Rules;

"holding" means that part of an area specified in a licence;

"licence" means a licence granted under the provisions of rule 4 of these Rules;

"licensee" means any person to whom a licence has been granted and includes any person who succeeds a licensee under the provisions of rule 7 of these Rules;

"manager" means such person as may from time to time be appointed by the Minister to be in charge of an irrigation area.

3. (1) The Minister may appoint a committee for any area, such committee to be known as an irrigation committee, to be responsible for advising the manager on the general administration of the area in accordance with Government policy.

(2) Such committee may either be the District Agricultural Committee of the district in which the area is situate or may be composed of such members as the Minister may appoint after consultation with the Provincial Agricultural Committee of the Province in which the area is situated.

4. Any person who resides in, carries on business in, or occupies any part of the area or grazes any stock thereon shall, unless he is the holder of a valid licence granted to him under these Rules by the manager with the approval of the Committee or is the authorized dependant of such licensee, be guilty of an offence against these Rules.

5. (1) Every licence granted under these Rules shall be in the form set out in the First Schedule to these Rules and shall be prepared in duplicate; the original shall be given to the licensee and the duplicate shall be retained by the manager.

(2) The manager shall maintain a register in which he shall enter the name of every licensee, the number of his holding and the names of his authorized dependants.

(3) The manager shall also maintain a separate register in which he shall enter the name of any successor nominated by the licensee in accordance with the provisions of rule 7 of these Rules, together with the number of the holding in respect of which the successor has been nominated.

6. Before issuing a licence, the manager shall:

(a) cause these Rules to be read and explained to the licensee in a language which he understands;

(b) give the licensee a copy of these Rules;

(c) obtain from the licensee, in the form set out in the Second Schedule of these Rules, a receipt for the Rules, an acknowledgement that he understands them and an undertaking to observe them.

7. (1) A licensee may, at any time after the date of being granted a licence under rule 4 of these Rules, nominate, in writing to the manager, another person to succeed him as licensee in the event of his death. A licensee may at any time, in writing to the manager, revoke or alter any such nomination which may have been made by him:

Provided that no person nominated as successor may succeed until he has attained the apparent age of eighteen years; if he has not reached that age, his guardian under customary law may, within one month of the licensee's death, and with the approval of the manager, appoint a person to act on his behalf until the successor is of age.

(2) No person nominated as a successor may succeed without the approval of the committee.

(3) The authorized dependant of a deceased licensee may, within thirty days of his death, appeal to the African court against the nomination under paragraph (1) of this rule, of a successor.

(4) The authorized dependant may –

(a) where a licensee dies without having nominated a successor in accordance with paragraph (1) of this rule; or

(b) where, under paragraph (3) of this rule, an appeal to the African court against the nomination of a successor has been successful,

within one month of the death of the licensee or one month after the determination of the appeal, as the case may be, nominate, in writing to the manager, a successor who must be approved by the African court.

(5) In the event of–

(a) no person being appointed within the time prescribed in the proviso to paragraph (1) of this rule; or

(b) no person being nominated within the time prescribed in paragraph (4) of this rule; or

(c) any person nominated or appointed under the provision of this rule failing to accept such nomination or appointment or failing to assume the responsibilities inherent in such nomination or appointment within a period of three months from the death of the licensee; or

(d) no successor being acceptable to the committee,

the holding shall be deemed to have been vacated, the licence in respect of such holding shall terminate, and a fresh licence may be granted in accordance with rules 5 and 6 of these Rules.

(6) In the event of a holding being deemed to have been vacated in terms of paragraph (5) of this rule:–

(a) the manager may make provision for the cultivation of any such holding and where appropriate recover the costs from the incoming licensee; and

(b) in accordance with rule 23 of these Rules reasonable compensation may be paid to the authorized dependant of a licensee in respect of any improvement to the holding effected by the licensee.

8. (1) Every licence granted under the provisions of rule 5 of these Rules shall be granted subject to the following conditions:–

(a) a licensee shall devote his full personal time and attention to the cultivation and improvement of his holding and shall not, without the permission, in writing, of the manager, allow any other person to occupy his holding or to cultivate it on his behalf;

(b) a licensee shall maintain the boundaries of his holding in a manner satisfactory to the manager;

(c) a licensee shall maintain at all times his holding and all field feeder and drainage channels to the satisfaction of the manager;

(d) a licensee shall maintain to the satisfaction of the manager all irrigation channels and works on or serving his holding;

(e) a licensee shall cultivate his holding to the satisfaction of, and in accordance with the crop rotation laid down by the manager and shall comply with all instructions given by the manager relating to the cultivation and irrigation of his holding;

(f) a licensee shall comply with all instructions given by the manager with regard to good husbandry, the branding, dipping, inoculating, herding, grazing or watering of stock, the production and use of manure and compost, the preservation of the fertility of the soil, the prevention of soil erosion, the planting, felling, stumping and clearing of trees and vegetation and the production of silage and hay;

(g) a licensee shall not hire, cause to be hired, or employ stock or machinery for cultural operations, other than stock and machinery owned by the manager, without prior approval, in writing from the manager;

(h) a licensee shall not absent himself from the area for longer than one month without prior approval, in writing, of the manager.

(2) Any licensee who fails to comply with the conditions specified in paragraph (1) of this rule shall be guilty of an offence, against these Rules.

(3) Any licensee who refuses, or without reasonable excuse fails, to comply with any of the conditions of this rule shall, in addition to any penalty that may be imposed under the provisions of paragraph (2) of this rule, be liable to have his licence terminated, subject to confirmation by the committee, by the manager.

9. (1) A licensee shall pay to the manager, on demand, such rates in respect of water and other services in respect of his holding as shall be calculated in accordance with rates prescribed by the Minister from time to time.

(2) The whole or part of any rates prescribed under paragraph (1) of this rule may be varied or remitted by the Minister either generally, or in any particular case, in his absolute discretion.

10. (1) The manager may allocate to a licensee a house to be occupied by him within the area, or may permit a licensee to erect his own house. In either event it shall be the duty of the licensee to maintain his house and precincts to the satisfaction of the manager and if the manager is dissatisfied with the condition of the house or precincts he may give written notice to the licensee of the repairs which he considers necessary and specify a reasonable time within which they must be completed. If the licensee fails to complete such repairs within the time specified and to the satisfaction of the manager, the manager may cause such repairs to be

carried out and may recover the cost thereof from the licensee. The licensee may not occupy any house other than that allocated to him without prior permission, in writing, from the manager.

(2) A licensee shall not construct buildings or other works of any kind on his holding or elsewhere in the area without the prior consent, in writing, of the manager. In the event of his having erected a structure or building without such consent, the manager may direct, in writing, that the structure be removed and the land returned to its original state. If the licensee fails to comply with this direction within one month, the manager may enter the building or structure for the purpose of demolition. Any expenses incurred by the manager for the removal of the building or structure may be recovered from the licensee.

11. (1) If a licensee is sentenced to imprisonment for a period of six months or more his licence may be terminated forthwith.

(2) If a licence is terminated under paragraph (1) of this rule a successor may be nominated or appointed in accordance with rule 7 of these Rules.

12. The manager shall have power to order the destruction of any crops planted in contravention of his instructions or of the provisions of these Rules and to recover the expenses incurred from the licensee. No compensation shall be payable in respect of crops so destroyed.

13. If, in the opinion of the manager, it would be beneficial to a licensee's crops or to all the licensees in the area, to cultivate by machinery, or to apply fertilizers, or manure, or to treat any crops or stocks in any way to protect them against disease, pests, or damage of any kind, then the manager may do so and recover the costs thereof from the licensee or licensees.

14. As soon as each crop has been harvested the licensee shall deliver it, other than such portion as he may wish to retain for his own consumption and that of his authorized dependants living with him, to the manager at a collecting station to be appointed by the manager, or shall otherwise dispose of it in accordance with the instructions of the manager.

15. The manager may, when necessary, collect, process and market the crops delivered to him under the preceding rule and may arrange for the sale of such crops, in which event, he shall give the licensees details of the sales of all such crops as soon as possible. The manager shall not be obliged to keep or sell separately, the crops of individual licensees.

16. (1) A licensee shall not keep on his holding any stock other than those specified in his licence and shall declare to the manager annually the natural increase in such stock and shall comply with any instructions issued by the manager as to their disposal.

(2) A licensee who fails to comply with the provisions of paragraph (1) of this rule, or with any instructions issued by the manager thereunder shall be guilty of an offence against these Rules and where any additional undeclared stock is found in the possession of a licensee within the area, the manager may order a licensee to remove such additional stock from the area forthwith.

(3) If a licensee fails to remove his additional stock in accordance with an order to that effect given by the manager under paragraph (2) of this rule, the manager may confiscate and sell such additional stock, paying the proceeds thereof, less any expenses incurred by such confiscation and sale to the licensee.

17. (1) If, in the opinion of the manager, a licensee has been negligent in the use of his land, the use of irrigation water, or the cultivation of his crops, the manager may direct him to take such steps as the manager may specify to remedy the effects

of such negligence, and in the event of a licensee failing to comply with any such directions, the manager may take such measures as he considers necessary to safeguard the crop and to preserve the holding and irrigation water and may recover the costs of any such measures from the licensee.

(2) If a licensee is absent due to illness or any other reason the manager may take such measures as he considers necessary to safeguard the crop and to preserve the holding and irrigation water and may recover the costs of any such measures from the licensee.

18. A licensee shall not permit any of his stock to be upon any part of the area which is closed to stock or to cause damage to any crops or water installations or communications or other property, and shall be liable to pay the cost of the repair of any damage so caused.

19. (1) Any licensee who wilfully or negligently causes damage or causes to be damaged any road, bridge, or culvert within the area shall be guilty of an offence against these Rules.

(2) The manager may, where such damage has been caused by a licensee, repair any such damage and shall recover the cost of the repairs to such damage from the licensee.

20. The manager may deduct from the proceeds of the sale, under rules 15 and 16 of these Rules, of any crops or stock belonging to a licensee–

(a) the costs or expenses incurred by the manager–

(i) in the making of provisions for the cultivation of any holding under paragraph *(b)* of rule 7 of these Rules;

(ii) in the removal of any building or structure or repairs carried out to any house under rule 8 of these Rules;

(iii) in the destruction of any crops under rule 12 of these Rules;

(iv) in providing manure, fertilizers, insecticides or any agricultural operations under rule 13 of these Rules;

(v) in the collecting, processing and marketing of crops under rule 15 of these Rules;

(vi) in remedying the negligence or safeguarding crops or preserving the holding under rule 17 of these Rules;

(vii) in repairing any damage caused by stock under rule 18 of these Rules;

(viii) in repairing damage under paragraph (2) of rule 19 of these Rules; and

(b) any amounts due for rates payable under rule 9 of these Rules, any outstanding amount of any advance made to such licensee for the purpose of the cultivation, irrigation or other improvement of his holding, and such charges as may be agreed to by the Minister on the recommendation of the committee.

21. Any person who causes any motor vehicle to be driven within the area over any road other than a public road within the meaning of the Public Roads and Roads of Access Ordinance (Cap. 229) unless he is in possession of a permit issued by the manager, and unless he complies with all conditions made on such permit by the manager, shall be guilty of an offence against these Rules.

22. (1) Where the manager is satisfied that a licensee has failed to comply with the provisions of any of these Rules or with any instructions given thereunder or under any other law for the time being in force, he may serve a notice in writing on the licensee requiring him to comply with the said provisions, instructions or rules within such time as is specified in the notice.

(2) If the licensee fails within such time to comply with the requirements of such notice the manager may, by notice in writing, call upon the licensee to show good cause, by a date specified in the notice, why his licence should not be terminated.

(3) If the licensee fails to show good cause as aforesaid to the satisfaction of the manager, the manager may, with the approval of the committee, give notice in writing to the licensee requiring him to remove himself, his dependants and his stock from the area within a period specified in such notice.

(4) A licensee who is given notice under paragraph (3) of this rule, may, within 28 days of such notice, appeal in writing to the Minister whose decision shall be final.

(5) If there is no appeal then the licence shall be deemed to have terminated on the date specified in the notice.

(6) If there is an unsuccessful appeal the licence shall terminate on such date as the Minister may specify.

(7) Any person whose licence has been terminated under this rule and who fails to comply with the terms of the notice given him shall be guilty of an offence against these Rules.

23. Where any licence is terminated in accordance with any of the provisions of these Rules, a board consisting of the manager, and one representative of both the outgoing and the incoming licensees, shall assess the amount, if any, due to the outgoing licensee or his dependants in respect of capital and labour expended by him in improving the holding and the manager shall make arrangements for the payment of such amount by the incoming licensee within such time as the manager considers reasonable.

24. The manager shall have power, in the event of any emergency, to order all licensees to undertake emergency repair work in any part of the area and any licensee who refuses to obey any such order by the manager shall be guilty of an offence against these Rules.

25. Subject to the provisions of rules 7, 8, 11 and 22 of these Rules, every licence granted under the provisions of rule 5 of these Rules shall be valid for a period of one year and from year to year thereafter, but may be terminated at any time–

(a) by the licensee giving to the manager six months' notice in writing of his intention to surrender his licence;

(b) by the manager, on the instruction of the Minister, giving to the licensee 12 months' notice in writing of his intention to terminate the licence.

26. Any person who–

(a) unlawfully interferes with the flow of irrigation water in canals or the opening or closing of control gates within the area;

(b) makes unlawful use of irrigation water by taking irrigation water out of turn or otherwise;

(c) refuses to permit the authorized passage of irrigation water across his holding;

(d) wilfully damages or obstructs canals or control works; or

(e) refuses to accept or drain off irrigation water when required to do so,

shall be guilty of an offence against these Rules.

27. (1) Any person who is guilty of an offence against these Rules shall be liable to a fine not exceeding two thousand shillings or to imprisonment for a period not exceeding two months, or to both such fine and imprisonment.

(2) Where any person is convicted of an offence against rule 4 or paragraph 7 of rule 22 of the Rules the court may, in addition to any penalty which it may impose, authorize any administrative officer or police officer to cause such person, together with his dependants and property, if any, to be removed from the area.

28. (1) The Native Lands (Irrigation Areas) Rules, 1959, are revoked.

(2) Nothing contained in these Rules shall effect the validity of any licence issued under rule 5 of the Native Lands (Irrigation Areas) Rules, 1959, or of anything lawfully done under those Rules.

FIRST SCHEDULE
THE TRUST LAND (IRRIGATION AREAS) RULES, 1962

Licence No. .....
..... son of .....
of the ..... district of the .....
Province is hereby authorized to occupy holding No. .....
of the ..... irrigation area for the period
from the ..... day of ....., 196...,

and from year to year thereafter unless sooner terminated in accordance with the provisions of the above Rules and to keep thereon not more than the following number of stock:–

..... bovines
..... sheep
..... goats
..... mules
..... donkeys
..... other stock
.....

subject to the conditions prescribed by the above Rules.

Dated this ..... day of ....., 196 ..

.....
Manager

In accordance with rule 6 of the above Rules I have caused them to be read and explained to the above-named licensee in the ..... language which he understands.

.....
Manager

SECOND SCHEDULE

(Rule 6)

I, ... son of .....
of the ..... district of the .....
Province hereby acknowledge receipt of a copy of the Trust Land (Irrigation Areas) Rules, 1962. I have had these Rules explained to me and I fully understand them and I undertake to observe them and to pay all sums of money payable by me.

.....
Signature or Thumb-print of Licensee

.....
Witness

.....
Date

Made this 22nd day of October, 1962.

By Command of the Governor.

T. TOWETT,
Minister for Lands,
Surveys and Town Planning.