

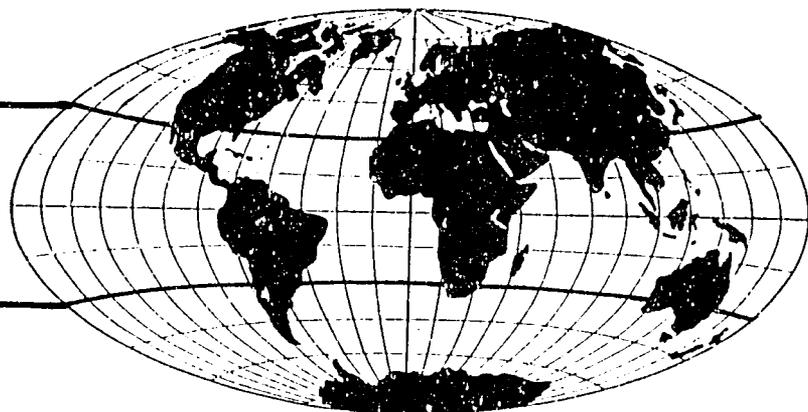
COOPERATIVE AGREEMENT ON SETTLEMENT AND RESOURCE SYSTEMS ANALYSIS

COMPARATIVE ANALYSIS OF
INSTITUTIONAL EXPERIENCES WITH
RIVER BASIN DEVELOPMENT
IN AFRICA: THE CASE OF
THE TANA BASIN, KENYA

by

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April 1987



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1. INTRODUCTION

This report provides a descriptive analysis of institutions concerned with the development of the Tana River basin. It is one of two reports on the Tana experience currently being written as a part of the SARSA study of "Institutional Experiences with River Basin Development in Africa." In addition to this paper, John Kimani, formerly Head of the Athi Basin Team, Tana and Athi Rivers Development Authority (TARDA), is providing an analysis of Tana basin institutions, with a particular focus on the National Irrigation Board (NIB) and its activities. Kimani's report, titled "River Basin Development: Case Studies Within Tana River Basin of Kenya," pays particular attention to the institutional aspects of the NIB-managed Mwea Irrigated Settlement Scheme, which is the most successful project in the Tana basin and among the most successful medium-scale irrigation schemes in Africa. Because Kimani's paper deals in-depth with the National Irrigation Board (NIB) and its projects in the Tana basin, it is given only minimal attention in this report, except to the extent that it relates to other institutions in the basin. Instead, the other major institutional actor in the Tana basin, the Tana and Athi Rivers Development Authority (TARDA), is emphasized in this report. This paper pays particular attention to TARDA's institutional relationships with smaller institutions, such as the Irrigation and Drainage Branch (Ministry of Agriculture and

Livestock Development), Agricultural and Livestock Cooperatives, and Non-Governmental Organizations (NGOs).

The report is organized into four sections: (1) The Historical Context of Tana River Basin Planning; (2) The Tana and Athi River Development Authority (TARDA); (3) TARDA's Relationships with Other Institutions (Including Donors) in the Tana Basin; and (4) Lessons Learned from the Tana Experience. Two recurrent themes highlight each of the different sections. The first is the importance of historical specificity in the analysis of Tana Basin institutions, since these institutions often arose and, consequently changed, in response to particular historical circumstances. The second theme is that Tana institutions promote the interests of their members, which may be complimentary or conflictive with other institutional interests in the Tana basin. The ability of certain segments of the population, whether they be planners, rainfed farmers, irrigated farmers, or herders, to defend and support their economic interests depends on the strength of their representative institutions. In short, those sectors of the Tana basin (e.g., the livestock sector) that have the weakest institutions have received the smallest share of development resources.

2. THE HISTORICAL CONTEXT OF TANA RIVER BASIN PLANNING

The Tana River originates in the highlands near Nairobi, flowing 708 kilometers in an easterly direction to the Indian Ocean. Its basin covers an area of approximately 62,210 square kilometers, which is approximately 10 percent of Kenya's total land base, and encompasses a great diversity of agro-ecological zones and production systems. These range from nomadic pastoralism and large-scale irrigation in the middle basin (arid rangelands) to low cost recession and flood water cultivation in the delta area (humid tropical lowlands) to intensive small-scale irrigation in the upper basin (highland zone).¹ Historically, this diversity has led to a very uneven pattern of investment and institutional development, whereas, in contrast to most other African basins, development activities and institutions have been concentrated more in the upper than in other parts of the basin. Because European settlers were attracted to the highlands of the upper Tana, with its excellent agricultural lands and plentiful water, this area received a disproportionate share of investment in transport, agriculture, and water. It also possessed the strongest institutions representing farmer interests. After independence in 1963, the trend toward investment in the upper Tana, rather than in other portions of the basin, continued into the 1970s.

2.1. Settler Institutions in the Colonial Era

The better agricultural lands around Nyeri, Kiambu and Thika in the upper Tana were alienated for European farmers, who were represented by several state-supported institutions, including the Kenya Farmers Association (KFA) and the Kenya Co-operative Creameries (KCC). As Leys (1974:36) points out:

These arrangements called for an extensive set of institutions for managing their (settler) details. This was most notable in the agricultural sector, with its system of settler-controlled marketing and regulatory boards, production committees and land boards in every area of the highlands, and the quasi-company organizations which handled particular products, especially the Kenya Farmers' Association (KFA) (which both purchased grain and distributed seed and implements, and also built up a near-monopoly of grain milling), and the Kenya Cooperative Creameries (KCC), which controlled and handled the Europeans' dairy output. But in the peak period of settler dominance in politics, i.e., from the mid-1920s until the late 1940s, settler control of policy through committees of the legislative council and government bodies of all kind was so commonplace that these more permanent and specialized institutions appeared as only part of a larger system of monopoly management which really included the whole administrative apparatus of the country, from the railways'

management to the district officers enforcing the labour and tax laws.

The concentration of development investment and institutional development in the upper Tana was established in the colonial period. Because there were few European settlers and businessmen with interests in the middle and lower Tana, these areas lagged in almost every indicator of development, a trend that has continued to present. Many of the institutions, operating in the upper Tana basin, were opened up to Africans in the 1950s, when economic restrictions on African producers were lifted. The KCC, the county councils, and producer cooperatives are among the more important institutions that became accessible to Africans, and that have played an important role in the post-independence development of the upper Tana. Yet the orientation of these institutions changed in many cases, with greater emphasis given to medium and small-scale rather than large-scale farmers, as was the case in the colonial period.

The European farmers of the upper Tana had strong linkages with international capital and markets, and were able to attract foreign investment to the area. In 1950, the English firm of Pickering and West established a fruit-processing plant in the Thika area of the upper Tana, which was to be supplied raw materials from local European farms (Swainson 1980:157). Later on, this plant was to be purchased by the Delmonte Corporation,

in a joint venture with the Government of Kenya, and to become one of the largest multinational investments in Kenya's agriculture sector. Other foreign firms, often in partnership with settler farms and firms, invested in the upper Tana basin, especially in agro-processing and light manufacturing industries around the Thika area. The colonial government provided the essential services, such as water, roads, and electricity, to support the investments, thus further differentiating the area economically from other parts of the basin. The development investments made by the government in support of private sector activities in the upper Tana were not made as part of an integrated plan for the development of the basin, but rather to enhance specific investments. With few exceptions, the development of large-scale commercial agriculture and industry continues to be carried out independent of an integrated development plan for the basin.

In sum, the strong presence of Europeans during the colonial period established a pattern of investment and institution development in the upper Tana that spilled over into the independence period. This is exemplified by the current presence of a large number of powerful local institutions (e.g., agricultural cooperatives and county councils) and national and multinational business firms in the area, which had their origins in the colonial period. Even after independence, these institutions, as well as more recent ones, such as the District

Development Committees (DDC), continue to be far more effective in competing for development resources and in promoting the interests of their members, than institutions involved in the middle and lower Tana. The concentration of development investment in the upper Tana, as well as the area's proximity to the important commercial centers of Nairobi and Nyeri, results in a more complex web of institutions there than elsewhere in the basin.

2.2 The African Land Development (ALDEV) Board and Other Government Institutions

The first basin-wide survey of the Tana dealt with the region's irrigation sector. It was carried out in the mid-1950s by the Ministry of Agriculture (MOA), and was motivated by the new initiative at the time to develop African smallholders (Brown 1955). The report was published after engineering work had already begun on the ALDEV irrigation schemes at Mwea (upper Tana) and Hola (middle Tana) and, therefore, was intended to find other possible sites for irrigation projects. The report by the Ministry of Agriculture identifies a number of possible investments in the basin, some of which are almost identical to those recommended by TARDA and NIB 20 and 30 years later. Among the most relevant findings of the MOA report are that (based on Ominde 1971:155-157):

-- the most optimal way to develop the upper Tana basin is through small-scale irrigation schemes;

-- by erecting a barrage a few miles upstream of Bura, it would be possible to have a large irrigation scheme on either the left or right side of the river bank;

-- in comparison to other areas of the basin, the delta region has considerable advantages because of good soils. The main food crop to be developed should be rice, with cotton and sugar also emphasized. The major constraint to the development of the delta is the area's unhealthy environment (ibid 1971:157).

It is likely that the early MOA report had an impact on later planning for the development of the basin. In particular, it pointed to two important development options that still influence current irrigation decisions in the Tana: the promotion of intensive small-scale irrigation in the upper basin and the strategy of developing large-scale irrigation in the middle and lower portions of the basin. This impact is reflected in current plans and programs of TARDA and NIB. For example:

-- TARDA has adopted a small-scale irrigation strategy for the upper Tana;

-- TARDA is currently planning for a large-scale rice project in the lower delta; and

-- the NIB planned and implemented a large-scale irrigation scheme at Bura, although management responsibility for this project was recently taken from NIB and given to the MOA.

The first government institution in the Tana basin to specifically promote the interests of African producers was ALDEV. As noted above, it established irrigation schemes at Mwea and Hola. It also established the institutional framework for the National Irrigation Board (NIB), which after 1967 took over the management of these two schemes. While ALDEV's mandate was broader than the irrigation sector, its most enduring impact was in this sector. In addition, to helping shape the institutional framework for government irrigation schemes in Kenya, it developed the most successful development project in the basin, the Mwea Irrigated Settlement Scheme. This scheme, which is discussed in considerable detail in Kimani (1987), provided the model for Kenya's medium and large-scale irrigation projects. Unfortunately, the irrigation model developed by ALDEV, while it apparently has proven successful in the Mwea case, has led to disastrous consequences elsewhere. The model called for a one year tenancy system, whereby farmers were leased plots on a year to year basis; a highly centralized management system, whereby almost all important decisions were made in Nairobi or by staff

of the headquarters posted at the scheme; and rigorous production and marketing schedules that allowed farmers little flexibility. In remote areas of the country, such as at Hola, the centralized management system resulted in considerable inefficiencies. Important decisions and delivery of needed inputs were (and are still) greatly delayed because many decisions had to be made in Nairobi. In the case of Mwea, which is located near Nairobi, this was not a major problem.² While there have been modifications in the management of government irrigation schemes since independence, the emphasis on centralized decision-making remains.

2.3. The Importance of Historical Events

Several important historical events have shaped development activities and institutions in the Tana basin.³ Among earlier events, the most important was the Mau Mau emergency in the 1950s, which forced the colonial state to more carefully consider the development of the African areas. The ALDEV organization clearly was a response to internal pressures to allocate resources to African farmers. In addition to irrigation schemes, ALDEV developed water supply schemes in the upper Tana basin. The irrigation schemes at Mwea and Hola, which were under the ALDEV program, were implemented in the 1950s. While plans for irrigation at these two sites had been formulated earlier, it

was the availability of Mau Mau detainees that led to their being used to construct the Mwea and Hola schemes.

Two other events that influenced the role of institutions in the Tana basin were the floods of 1961 and the prolonged drought of the 1960s. In 1961, the entire Lower Tana region was inundated with floods and isolated from the rest of the country, and emergency food relief had to be flown into the area. The event brought considerable attention to a part of the basin that had received virtually no development inputs to date. Although it is questionable as to whether the area really suffers from food shortages (cf. Kimani 1987), except in the most extreme years (e.g., 100 year flood event),⁴ the outside perception was that of a potential famine area. Efforts were soon initiated by Non-government Organizations (NGOs), mainly church-affiliated, to make the area more self-sufficient in food by investing in small-scale pump irrigation schemes. NGO projects have been the focus of a recent World Bank and Dutch Aid-funded rehabilitation effort, which has been implemented by the Irrigation and Drainage Branch, Ministry of Agriculture. Thus the floods of 1961 led to involvement of relief and development institutions (both local and foreign) in the lower Tana, a pattern that has become increasingly complex in recent years.

Like the floods of 1961, the prolonged drought of the 1960s resulted in further interest in the Tana basin, but in this case

attention was focused on the Garissa area of the middle Tana. In the 1960s, several church-related organizations established small-scale irrigation schemes along the Tana near Garissa to cater for impoverished nomads. It should be noted that the impoverishment of herders at the time was due not only to drought, but also as a result of prolonged fighting in northeastern Kenya. Nevertheless, the effect was the same--attention was focused on the Tana area, and a number of outside institutions became involved in the region. In addition to NGOs, DANIDA (Danish Aid) was the major donor in the area, initiating the Garissa Irrigation Development Program in 1970 (Blackie et al. 1984:66). While DANIDA has clearly taken a development posture in the Garissa area, many of the other organizations have been interested in short-term relief, rather than long-term development.

A fourth historical event that clearly influenced institutions in the Tana basin was the rise of the Amin regime in neighboring Uganda. When Amin began to consolidate his political base in the early 1970s, beginning a long period of political uncertainty and tyranny in the country, Kenya was more than 70 percent dependent on energy imported from Uganda. While development of hydropower in the Tana basin had begun as early as the mid-1960s, it was not until the 1970s that an accelerated energy program began. The risks of continuing to depend on Uganda as a source of electricity was an important factor in the

rapid development of the Tana's hydropower sources. It was also an important factor in the creation of a Tana River Basin Authority, which in its early years focused almost strictly on planning for the basin's hydropower potential.

The need to rapidly develop hydropower sources in the Tana basin required a more careful planning and monitoring of the area's water resources, than had been the case in the past. The formation of TRDA in 1974, in part, was to help plan for the integrated development of the basin's water resources, but more importantly it was to facilitate the development of hydropower. While it is likely that hydropower development would have been the most important activity of TRDA in its early years, the dependence on Ugandan energy was an important factor in ensuring the hydropower orientation. TRDA and the country's mandate was to develop energy sources in the Tana, and all other activities, such as irrigation and fisheries, were of very secondary importance. As we will discuss in the next section, TRDA's bias toward hydropower development, even with the country's reduced dependence on imported energy, still very much influences its development agenda.

3. THE TANA AND ATHI RIVERS DEVELOPMENT AUTHORITY (TARDA)

Initial planning for a Tana river authority began in 1971, when at the request of the Government of Kenya (GOK), the UNDP financed a small team of expatriates to examine the feasibility of a river basin authority. The UNDP team recommended the formation of TRDA which would have initial responsibilities to plan, monitor, and evaluate development activities in the basin, and to mediate potential water use conflicts among hydropower, irrigation, and urban (Nairobi) users. In 1974, an act of Parliament formally created the Tana River Development Authority (TRDA), and placed it under the Ministry of Finance and Planning. Among government officials, it seemed that the Minister of Finance and Planning was the most active proponent of a river basin authority; most other public officials were indifferent to the idea. Unlike other African countries where river basin authorities exist, river basin development at the time was not an important national development goal in Kenya.

In 1981, the original legislation was amended to include the Athi River basin under the institution's mandate, and TRDA's name was changed to the Tana and Athi River Development Agency (TARDA). This change correlates with a period in Kenya when other river basin authorities, based on the TRDA model, were being created, and there was a mandate to include most parts of the country under a basin authority. Rather than create a

separate authority for the nearby Athi river, it was more convenient to ammend TRDA to include responsibility for the Athi basin.⁵

The GOK was concerned with the development of hydropower in the Tana, but not with river basin development or irrigation per se. It has only been recently, with the realization that further expansion of rainfed agriculture in the country is limited, that there has been a national concern with irrigation development and, consequently, with the Tana basin; the Tana contains the largest proportion (approximately 200,000 hectares) of Kenya's irrigable land.

The legislation that created TRDA (and later TARDA) describes its functions as (Government of Kenya 1977 [revised 1982]:5-6):

(a) to advise the Government generally and the Ministeries set out in the Schedule in particular on all matters affecting the development of the Area including the apportionment of water resources;

(b) to draw up, and keep up to date, a long-range development plan for the Area;

(c) to initiate such studies, and to carry out such surveys of the Area as it may consider necessary, and to assess the demands within the Area on the resources thereof, including electric power generation, irrigation, wildlife, land and other resources, and to recommend economic priorities;

(d) to coordinate the various studies of, and schemes within, the Area so that human, water, animal, land and other resources are utilized to the best advantage, and to monitor the design and execution of planned projects within the Area;

(e) to effect a programme of monitoring of the performance of projects within the Area so as to improve that performance and establish responsibility therefore, and to improve future planning;

(f) to ensure close co-operation between all agencies concerned with the abstraction and use of water within the Area in the setting up of effective monitoring of that abstraction and use;

(g) to collect, assemble and correlate all such data related to the use of water and other resources within the Area as may be necessary for the efficient forward planning of the Area;

(h) to maintain a liaison between the Government, the private sector and foreign agencies in the matter of the development of the Area with a view to limiting the duplication of effort and to assuring the best use of technical resources;

(i) to render assistance to operating agencies in their applications for loan funds if required; and

(j) to cause the construction of any works necessary for the protection and utilization of the water and soils of the Area.

We will discuss later in this paper how TARDA's operations have actually corresponded with the above intended goals, indicating those areas where they have succeeded, and those where they have not. In general, however, as the institution has matured and taken on its own identity, TARDA has broadened its activities to include more than just planning for hydropower. The institution itself has changed considerably since its inception, with a greater concern for the implementation of large, capital-intensive projects. As we will show later in the paper, TARDA's emergence as an implementing agency, which was not foreseen in its original or revised legislation, has been a significant change. The emergence as an implementing agency, rather than strictly a

planning institution, will greatly affect future planing in the Tana basin.

3.1. Organizational Structure of TARDA

TARDA is an independent, state-owned parastatal that is currently affiliated to the Ministry of Energy and Regional Development (MOERD). It can solicit funds directly from the Treasury or from foreign donors without going through its affiliated Ministry, and its Chairman is appointed directly by the President, rather than by the MOERD. TARDA initially was under the Office of the President, and after a short period of time, the Ministry of Finance and Planning (MOFP). From the MOFP, TARDA was transferred to the Ministry of Water Development, and then to the Ministry of Regional Development, which was eventually combined with the Ministry of Energy in 1983 to form the MOERD. The shift out of MOFP, a non-implementing ministry, allowed TARDA to undertake its own projects. In total TARDA has been affiliated with four different ministeries, as well as with the Office of the President. The uncertainty over where to place TARDA among national institutions reflects an ambiguity that Kenya held (and still holds) for river basin development.

TARDA is supervised by an interministerial committee of government officials and private citizens, which in principle should help the authority to coordinate its activities with other

relevant institutions. In practice, however, the existence of interministerial committees rarely assures close coordination among different institutions, and the TARDA case is not an exception (discussed in greater detail below). The composition of the interministerial committee is (Government of Kenya 1977 [revised 1982]:4):

- a Chairman appointed by the President;

- the Permanent Secretaries of the Ministries of Agriculture and Livestock Development, Economic Planning and Finance, Natural Resources, Energy and Regional Development, Wildlife and Tourism, and Water Development;

- the General Manager of the National Irrigation Board;

- the Chairman of the East African Power and Lighting Company Limited;

- the Director of the Water Department;

- the Managing Director of TARDA; and

- five other members (appointed for periods of three years), who shall not be members of the Government service,

and who shall be appointed by the Minister in consultation with the President.

The interministerial committee is supposed to meet on a quarterly basis, but in actuality it usually meets only when there is an important issue to discuss. One of the important functions of the interministerial committee is to allow TARDA to advise the different ministries on their activities in the basin, especially as it effects the allocation of water resources. The interministerial committee's record in this respect is mixed. In the case of irrigated agriculture, communication with the relevant institutions seems to have improved (at least in the case of national institutions), but with other ministries this does not seem to have been the case. For instance, TARDA does not seem to have coordinated their activities with the Ministry of Environment and Natural Resources. Several of TARDA's existing (e.g., the Masinga Dam) and proposed activities (e.g., the Tana Delta Irrigation Scheme and Kiambere Dam) have or will have deleterious effects on the environment, but the advice of the Ministry of Environment and Natural Resources has not been sought. The environmental impact studies that have been completed in the area were commissioned directly by TARDA. Because TARDA directly commissions the environmental impact studies, they draw up the Terms of Reference and are able to either accept or reject the findings of the studies.

TARDA's governing committee is made up almost strictly by representatives of national-level institutions. The County Councils or Municipal councils or other local bodies in the basin are not represented on the committee. Nor are line ministries that represent local organizations found on the committee. For example, the Ministry of Cooperatives, which in the upper Tana alone represents more than 50 agricultural cooperatives, is not represented on the committee; nor is the Ministry of Culture and Social Affairs, which represents local community development organizations and small-scale water user associations. In addition, the Ministry of Local Government, under which such locally elected bodies as municipal and county councils are affiliated, is not found on the committee. However, the Ministry of Finance and Planning, which is responsible for the District Development Committees (DDCs), is represented on the committee, but the DDCs tend to be less reflective of local interests than the other local organizations mentioned above. The majority of members of the DDCs are representatives of line ministries and of the political administration (e.g., District Commissioners and Officers). We would argue that TARDA's relationship with the Ministry of Finance and Planning is more in terms of finances, than it is with the Ministry's district planning and development (the "district focus") mandate.

The current organizational structure of TARDA itself reflects a greater concern with the planning and implementation of sector activities other than hydropower. This was not the case in the past. Figures 1 and 2 present the TARDA organization at two different periods, 1982 and 1986, allowing a comparison of recent organizational change at TARDA. Among those professional positions available in 1986 (Figure 2), more than 90 percent are currently filled. The major vacancies remain with the new Delta Irrigation Scheme, which has only recently (April 1987) secured initial funding for a Phase I. In comparing the two organizational charts, one finds very little difference in the basic structure, but significant changes in the breadth of activities represented at TARDA. Most important are the two new project cells for the Delta Irrigation Scheme and the Masinga fisheries program. Another difference between 1982 and 1986, as reflected in Figures 1 and 2, is the greater number of agriculturalists that are now employed at TARDA. Importantly, the Athi basin team is headed by an agriculturalist, rather than by an engineer or hydrologist, reflecting again the agency's new concern for irrigated agriculture.

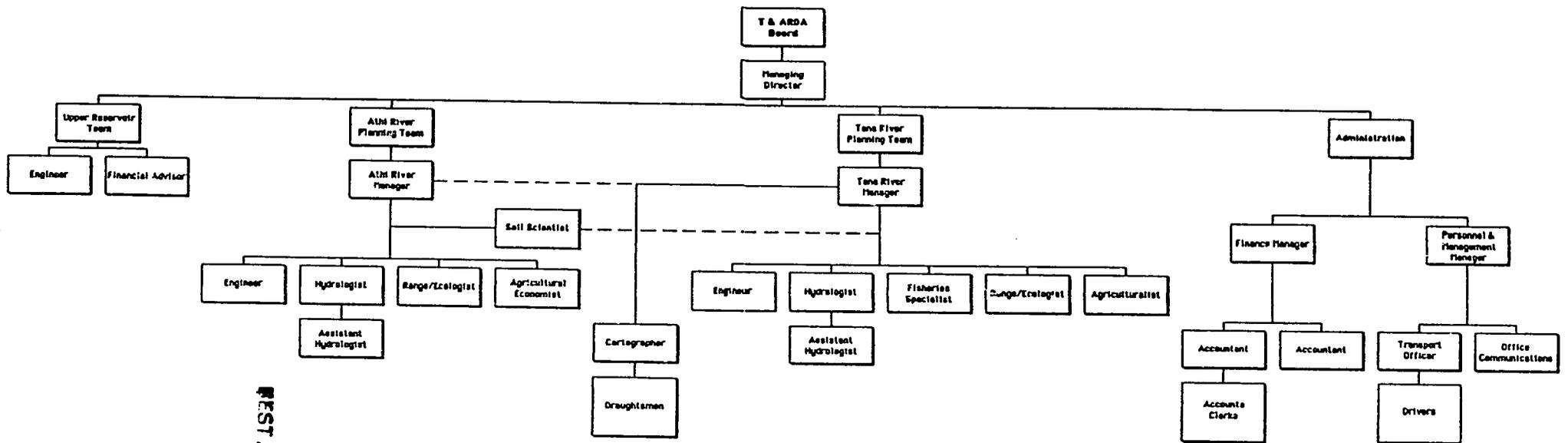
An important characteristic of the special project cells (e.g., Delta Irrigation Scheme) is that two of the three cells are given the importance of basin planning teams on the organizational chart. They report directly to the Managing Director, rather than to the respective basin teams. That TARDA

allocated the Delta Scheme and Kiambere Dam such importance is further evidence of the institution's increased concern with project implementation. Both the Kiambere and the Delta Schemes are very large, capital-intensive projects (each in excess of US \$80 million), which increase the total funding level of TARDA probably by a factor of three. The scale of funding of these projects accounts for their importance in the TARDA structure, and for the fact that the small, internally-funded Masinga fisheries program is allotted only minimal importance. The implementation of capital-intensive projects by TARDA began with the Masinga dam in 1977, but it was not until the early 1980s that plans for implementing a large-scale irrigation project began.

The addition of the Athi Basin does not seem to have created significant internal tensions between the old (Tana basin) and new (Athi basin) planning teams. In terms of collaboration between the two basin teams, this has been facilitated by staffing the Athi basin team mainly with individuals who had previously worked on the Tana basin. Nevertheless, because of the greater number of development activities in the Tana than in the Athi basin, the former is allotted considerably more importance within TARDA. To date, the Athi team has mainly been concerned with a small, pilot irrigation scheme at Kibwezi, the planning of the Munyu dam, and the implementation of district-based resource inventories.

TANA AND ATHI RIVERS DEVELOPMENT AUTHORITY ORGANISATION CHART 1982

FIGURE 1

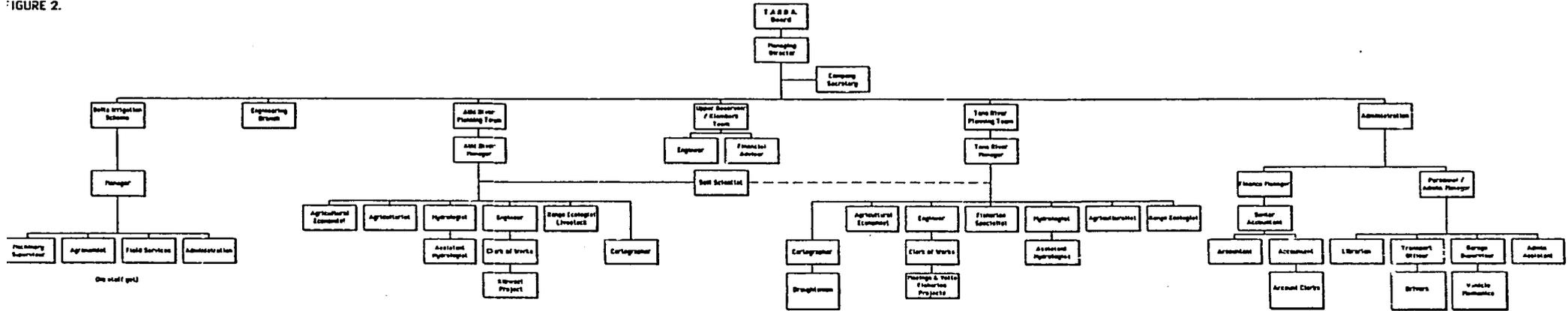


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TANA AND ATHI RIVERS DEVELOPMENT AUTHORITY ORGANISATION CHART 1986

FIGURE 2.



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In spite of its mandate to monitor and evaluate development activities in the Tana and Athi basins, TARDA does not have a special monitoring and evaluation cell (see Figures 1 and 2). TARDA officials claim that because the institution has only recently begun to implement its own projects, it has not been involved in monitoring and evaluation. The assumption here is that the institution that implements the activity should also be involved in the monitoring and evaluation of it. This seems to contradict the rationale for an agency, such as TARDA, which was to be an impartial actor to advise, plan, monitor, and evaluate water and land use activities in the basins. TARDA officials recognize its lack of an M & E Unit as a problem, but the motivation to create one is for TARDA to monitor and evaluate its own activities, rather than the projects of other institutions in the Tana, such as the NIB, the Irrigation and Drainage Branch, and NGOs. Again, this is inconsistent with the original legislation that created the river basin authority.

3.2. Capacity to Conduct Analytical Work

In spite of the fact that much of TARDA's analytical studies and appraisal and design activities have been carried out by expatriate advisors and firms, the authority has conducted a considerable amount of good analytical work. TARDA carried out the feasibility studies for small-scale irrigation projects at

Kibirigwe, Mitunguu, and the lower Tana (cf. TRDA nd; 1978) and has carried out a series of district-based resource inventories for the country's district development program. It was on the basis of TARDA's project feasibility work in the upper Tana, that the Irrigation and Drainage Branch adopted a small-scale approach to irrigation development in the area, and began to initiate an important pilot scheme at Kibirigwe (discussed in detail in Kimani's report). TARDA's feasibility work on small-scale irrigation in the upper Tana was carried out mainly in-house by Kenyan staff.

TARDA has also designed, and in this case implemented, an important pilot irrigation scheme at Kibwezi (Athi river). All of the analytical work on this scheme has been carried out by Kenyan staff of TARDA, with its objective being to prove that government-sponsored, small-scale irrigation schemes in Kenya can be commercially viable. More specifically, TARDA hopes to use the results of the scheme to justify a large, multi-purpose dam on the Athi river. While the scheme has not solicited local participation to date, its initial results do show that with proper management and crop mix, small-scale irrigation can be economically viable. The importance of the Kibwezi work is that it was done by TARDA staff, rather than by expatriates, and that it is an important planning activity that has implications for small-scale irrigation planning in both basins.

In contrast to recent trends, the analytical work carried out by TARDA in its early years was done completely by expatriate advisors. With funding from the British government, four expatriate technicians were posted at TARDA from approximately 1974-77, and carried out most of the agency's important studies and design work. They conducted a natural resource inventory of the basin, which helped to identify dam sites (such as the one at Masinga) and small-scale irrigation schemes in the upper Tana. This team also helped to build the first computer simulated model of the Tana river (1975), which was used mainly to estimate river flow for hydropower development. This model has recently been updated by a Dutch expatriate firm (Delpht Hydrologic Laboratory), which should allow it to account for recent changes in the Tana and to give more attention to irrigation; the initial model was constructed almost solely for hydropower purposes.

TARDA seems to rely most heavily on expatriate input for feasibility and design studies of dams and of capital-intensive schemes in general. The design work for both Masinga and Kiambere was carried out completely by expatriate firms, with TARDA's role mainly limited to writing of the Terms of References for the work. It is said that neither the plans for the Masinga nor Kiambere dams were reviewed locally by Kenyan engineers, but that TARDA relied solely on the work and advice of expatriate firms. The cost analysis, the construction design, etc. were

done by expatriate firms, with TARDA technicians helping only after most of the analytical work was completed.

Another analytical exercise in which TARDA has relied almost solely on expatriate assistance is the baseline and feasibility studies conducted for the Tana Delta Irrigation Scheme. The contract for this work was given to Haskoning Ltd, a Dutch firm, which utilized a predominantly expatriate team to do the work; the study was funded by Dutch Aid. Initial prefeasibility work on the delta scheme was done by TARDA staff. From the data presented in the reports (Haskoning 1982), especially the sections dealing with the livestock sector, there seems to have been strong pressure to provide economic justification for a large-scale irrigation scheme in the lower Tana. That TARDA has had so little analytical input into its three major activities--the Kiambere and Masinga Dams and the proposed Tana Delta Irrigation Scheme--suggests that the donors, who are funding these projects, may have strongly dictated the type of analytical work to be done and by whom (discussed further in section 3.3 of the report).

TARDA has had to rely on outside assistance for certain analytical work that it does not have the capacity to do itself. These include, for example, environmental and socio-economic impact and resettlement work, which it has contracted with, in some cases, local Kenyan firms to conduct. In other cases, such

donors as the World Bank have provided personnel to do the needed work. TARDA has commissioned these types of studies only in relation to projects that it has, or will have, implementation responsibility. TARDA does not have a social scientist on its staff, and thus has done virtually no socioeconomic work of its own. In regard to resettlement, which is an important issue both at Kiambere and Masinga, the impetus for looking at this issue came from the donor(s), rather than from TARDA. While TARDA has vigorously pursued the implementation of dam projects and some of the environmental work associated with them (e.g., reforestation), it has tried to stay out of resettlement issues, leaving the implementation of resettlement to the District administration.

Surprisingly, TARDA has only minimal capacity to collect its own hydrological data. Instead, it relies on the records of the Ministry of Water Development (MOWD). The authority recognizes that, as the activities on the river become increasingly complex, more in-depth hydrological data, which is not currently being collected by the MOWD, will be needed (TARDA 1982:34-35):

TARDA acquires the records it requires from WRD (Water Resources Department, Ministry of Water Development) and interprets them as necessary. Unfortunately the present coverage is not always sufficient in areas where a high rate of water based development is planned, and in consequence it

is often necessary to resort to synthetic hydrology extrapolated from the few records that are available. This process will become increasingly unsatisfactory as the water resources situation grows tighter.

TARDA has been working closely with the MOWD to improve the quality of data collection in the basin, to extend the network of gauging stations, and to create its own data gathering capacity (cf. TARDA 1982:35). It has also commissioned a river morphology study by an expatriate firm, which was recently completed but unavailable to the SARSA team in November 1986. It is likely that this study will enhance TARDA's hydrological data base.

At present (1986) there is only one expatriate advisor (posted by the World Bank) at TARDA to assist with the Kiambere Dam project. As we will show in the section on expatriate firms and donors (3.3), the "outsider" influence on TARDA activities remains considerable, although this is not reflected in the number of expatriate advisors posted at TARDA headquarters.

3.3 Multi-objective Planning at TARDA

Integrated planning of the Tana basin has been hampered by the lack of a master plan. Although efforts toward producing a master plan began as early as the mid-1970s, with the work being carried out mainly by expatriate advisors, TARDA has yet to

produce an integrated plan for the development of the basin. The lack of a master plan is seen by TARDA as a serious constraint to planning, and one which they hope to overcome in the next five years. Without a master plan, TARDA is likely to continue to design and implement discrete activities, without trying to integrate them with existing or planned activities. That dam construction at Masinga and Kiambere has been carried out with little attention to existing irrigation systems (including flood-based) in the lower Tana is evidence of the lack of integrated planning.

On the positive side, TARDA does produce ten year forward planning documents for the basin, which since the early 1980s have alloted more attention to environmental, fisheries, irrigation, and other non-hydropower activities. Although these documents cannot substitute for a master plan, they do lay out in fairly good detail. a ten year plan of action. However, similar to Kenya's district development plans, they tend to be "shopping lists", and have to be carefully scrutinized in the field to see what has actually been done. For example, the Masinga fisheries program, which was to begin implementation in 1985, has still not begun (TARDA 1982); and a soil conservation programme in the upper Tana, which was to begin in 1982, is only just now being implemented.

The TARDA forward plan for 1986-1996 is extremely ambitious and is likely to require considerable donor funding to achieve. Tables 1-6 list the projects (with their levels of funding) that TARDA hopes to carry out in this ten year period. Table 5 on fisheries development is presented in a different form than the other tables because funding figures for most of these projects were not available.

There are several important conclusions about TARDA's planning objectives that can be derived from the data in the tables. First of all, TARDA is committing itself to a series of fishery, livestock, natural resource management, and irrigation activities that were not reflected in previous forward plans (cf. TARDA 1982), and which it does not seem to have the internal capacity to conduct. These include a honey project, an animal traction project, and a crocodile ranch. These are, undoubtedly, low priority projects that will require new expertise at TARDA if they are to be implemented.

Hydropower projects still account for the vast majority of proposed budget outlays (approximately 91 percent of total) at TARDA. The percentage of total funding allocated for each of TARDA's other sector programs are: irrigation (9 percent); hydrology and water resources work (.1 percent); livestock (.5 percent); and catchment management (.4 percent). Since budget

TARDA IRRIGATION DEVELOPMENT PROGRAMME

1986/1987 — 1995/1996

Table 1

	DEVELOPMENT EXPENDITURE (IN MILLIONS OF SHILLINGS)										
	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	TOTAL
Mitunguu Irrigation Project	-	-	15.00	20.00	15.00	-	-	-	-	-	50.00
Ishiara Irrigation Project	-	-	-	0.70	3.00	3.00	-	-	-	-	6.70
Thanantu Valley Irrigation Project	-	-	10.00	15.00	20.00	-	-	-	-	-	45.00
Rubingazi Irrigation Project	-	-	5.43	80.00	100.00	-	-	-	-	-	185.43
Kibirigwi Irrigation Project	0.60	1.00	1.00	1.00	1.00	-	-	-	-	-	4.60
Tana Delta Irrigation Project (smallholder)	-	100.00	248.00	300.00	300.00	-	-	-	-	-	948.00
Tana Delta Irrigation Project (Estates)	-	17.75	17.75	17.75	17.75	17.75	17.75	17.75	17.95	-	142.20
Lower Tana Irrigation Studies	-	-	-	0.60	-	-	-	-	-	-	0.60
Mwea Rice Scheme Studies	-	-	6.00	-	-	-	-	-	-	-	6.00
TOTAL	0.60	118.75	303.18	435.05	456.75	20.75	17.75	17.75	17.95	-	1,388.53

* 16 Ksh = \$1

TARDA HYDRO-POWER DEVELOPMENT PROGRAMME

1986/1987 — 1995/1996

Table 2

Project	DEVELOPMENT EXPENDITURE (IN MILLIONS OF SHILLINGS)										
	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	TOTAL
Topographic & Geological Studies: Grand Falls, Usueni, Adamson's Falls & Kora Hills	5.0	5.0	-	-	-	-	-	-	-	-	10.0
Feasibility Studies: Grand Falls, Usueni, Adamson's Falls			10.0	20.0							30.0
Design Studies: Usueni, Adamson's Falls & Grand Falls					100.0	150.0					250.0
Construction: Kiambere Usueni or Adamson's Falls or Grand Falls	1,064.0	420.0	220.3	-	-	-	-	-	-	-	1,704.3
	-	-	-	-	-	-	2,606.0	2,501.4	4,628.4	3,683.7	13,419.5
Total	1,069.0	425.0	230.3	20.0	100.0	150.0	2,606.0	2,501.4	4,628.4	3,683.7	15,413.8

* 16 Ksh = \$1

1986/1987 – 1995/1996

Table 3

Programme	DEVELOPMENT EXPENDITURE (IN MILLIONS OF SHILLINGS)										
	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	TOTAL
Evaluation of Lower Tana River Morphology	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.14
Operation of Tana River Simulation Model	0.08	0.05	0.03	0.02	0.02	0.01	0.01	0.01	0.01	0.01	0.25
Soil Erosion, Water Quality and Sediment Transport Monitoring	0.15	0.01	0.01	0.01	0.01	0.05	0.01	0.01	0.01	0.01	0.28
Water Resources of Chania/Thika-Review	0.01										0.01
Thiba-Nyamindi, Rwamuthambi, Sagana Water Resources Review			0.02								
Mutonga Catchment Studies				0.01							0.01
Upper Tana Stressed Tributary Flows				0.01	0.01	0.01					0.03
Seasonal Flows and Groundwater in Semi-Arid Areas	0.01	0.20	0.30	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.72
Hydrometeorological Data Bank	0.10	0.10	0.80	0.05	0.05	0.03	0.03	0.03	0.03	0.03	1.25
TOTAL	0.37	0.38	1.18	0.15	0.13	0.14	0.09	0.09	0.09	0.09	2.71

* 16 Ksh = \$1

TARDA CATCHMENT MANAGEMENT PROGRAMME

1986/1987 – 1995/1996

Table 4

Project	DEVELOPMENT EXPENDITURE (IN MILLIONS OF SHILLINGS)										TOTAL
	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	
Masinga Area Soil Conservation	–	5.30	5.30	5.30	5.30	5.30	5.30	–	–	–	31.80
Masinga Reafforestation Project	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	2.00
Lower Tana Fuelwood Project	0.20	0.20	0.20	0.20	0.20	0.20	0.20	–	–	–	1.40
TOTAL	0.40	5.70	5.70	5.70	5.70	5.70	5.70	0.20	0.20	0.20	35.20

* 16 Ksh = \$1

TARDA FISHERIES RESOURCES DEVELOPMENT PLAN FOR 1986-1996

Table 5

Project Type	Project Specification	Priority Ranking	Remarks
Aquaculture	(1) Crocodile culture	high	Aim at setting up 3 crocodile rearing and farming ranches on Tana River Basin.
	(2) Culture of freshwater crayfish	low	Project expected to step up fisheries production at Masinga Reservoir.
	(3) Tilapia culture	high	Project expected to come up at Taite-Taveta District. Expansion of Yatta set up.
Mariculture	(1) Shrimp culture	low	Project siting at Kipini near the rice project.
	(2) Culture of mullets	medium	Project siting at Kipini along with the shrimp culture.
	(3) Oyster culture	low	Project siting near Malingi due to proximity to the marine reserves there and hence ease of obtaining seed.
	(4) Lobster culture	low	Project siting at Malindi South Coast in Kwale District.
	(5) Culture of crabs	low	Project siting in suitable mangrove swamps along the coast.
Lake Fisheries	(1) Development of lake fisheries	medium	Included here are Masinga, Kiambere, Ox-bow lakes within the basins, Lake Chala and Lake Jipe.
	(2) Exploitation of lake fisheries	medium	As above.
Sea Fisheries	(1) Resource inventory	high	Inshore and offshore.
	(2) Fishing gears and fishing methods appraisal	high	Both inshore and offshore.
	(3) Resource exploitation	high	Both inshore and offshore.
	(4) Infrastructural facilities	high	Centered at Kipini.
	(5) Market surveys	high	

TARDA LIVESTOCK PROGRAMME

1986/1987 - 1995/1996

Table 6

Project	DEVELOPMENT EXPENDITURE (IN MILLIONS OF SHILLINGS)										TOTAL
	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	
Bura Dairy Ranch	-	-	11.25	18.75	18.75	-	-	-	-	-	48.75
Animal Traction Project	-	-	-	-	0.30	0.30	0.20	-	-	-	0.80
Kitui Honey Project	-	0.35	0.35	-	-	-	-	-	-	-	0.70
Goat and Sheep Ranch (Masinga)	0.58	0.58	0.15	-	-	-	-	-	-	-	1.31
TOTAL	0.58	0.93	11.75	18.75	19.05	0.30	0.20	-	-	-	51.56

* 16 Ksh = \$1

figures were only given for a segment of the proposed fisheries program, they have not been used in the above calculation.

The budget data reveal that TARDA's diversification into non-energy projects has not come at the expense of its hydropower program. The latter still remains TARDA's main emphasis.⁶ If TARDA does receive all of the proposed funding (in excess of \$80 million) for the Delta Scheme (to be financed by Japanese Aid), the proportion of total funding allocated to hydropower development is likely to be reduced slightly. In the 1986-1996 plan, hydropower and irrigation development account for approximately 99 percent of proposed funding.

In comparing the current ten year program with earlier ones, the significant differences are in the scale of funding and the diversity of programs. In terms of the proportion of funding allocated to different programs, however, there is little change, except that the proportion of funding for irrigation has increased slightly. TARDA's recent reports provide considerable written justification for diversification into a range of activities, but the corresponding budget outlays reflect only minimal change from earlier patterns (cf. TARDA 1986).

4. TARDA'S RELATIONSHIPS WITH OTHER INSTITUTIONS (INCLUDING DONORS) IN THE TANA BASIN

TARDA is a national parastatal, with regional responsibilities, and governed by a committee comprised mainly of representatives of national institutions. The headquarters of TARDA is in Nairobi, with offices neither at the Provincial nor District levels. By its very structure then, TARDA is likely to coordinate its activities more closely with national institutions, than with regional and local institutions. This, indeed, has been the case.

TARDA mainly designs and implements "national" development schemes (hydropower and large-scale irrigation schemes), and, therefore has not felt the need to seek linkages with local institutions, which often are poorly funded. Moreover, because neither a basin-wide master plan nor a basin-wide land and water use survey has been conducted, it is unlikely that the authority has a good understanding of the full range of institutions and land and water use systems in the basin. This latter factor may account, in part, for what seems to be an insensitivity on the part of TARDA to local institutions and local production systems.

The lack of solid "linking" institutions⁷ impedes TARDA's ties with local organizations and activities. Among institutions, the District Development Committees (DDCs) probably

could best serve a "linking" function, but, as indicated earlier in the paper, they are mainly represented by national ministries. The DDCs also suffer in other ways that inhibit their effectiveness. These include the fact that they are (1) new and fragile institutions that are very weak in the more remote districts of the basin (e.g., Tana River and Garissa Districts); (2) not well funded in many districts; and (3) overloaded with other demands that would impair their ability to represent local interests vis-a-vis TARDA.

In this section of the report, I present cases both of adequate and inadequate collaboration between TARDA and other institutions in basin planning, and then discuss how the role of donors in the Tana has affected institutional relations, as well as the planning of the basin generally. Descriptions of many of the institutions discussed here can be found in Appendix I. In addition, Appendix II presents details on two cases of non-TARDA activities in the basin that are discussed in this section.

4.1. Cases of Institutional Collaboration

Kenya Power and Light Company. Given its emphasis on hydropower, it is not surprising that TARDA maintains its closest institutional linkages with this organization. The chairman of the Kenya Power and Light Company (KPLC) sits on the TARDA board, and TARDA works very closely with KPLC in the design and

construction of hydropower schemes. TARDA coordinated much of the design and feasibility work for two of the three KPLC dams on the Tana. This accounted for the bulk of TARDA's work in its early years. It also constructed the Masinga dam, while the KPLC operates it; and TARDA is currently building the Kiambere Dam, which will also be operated by KPLC. The Masinga dam "protects" and regulates water for the three downstream dams built by KPLC--the Kamburu, Gitaru, and Kindaruma dams. TARDA and KPLC jointly have worked out a power price schedule on the Masinga dam to reflect KPLC's operating responsibilities (Howe 1986:1). The sale of electricity generated at Masinga to KPLC is TARDA's major source of revenue at present. Unlike TARDA's relations with other institutions working in the Tana basin, the relationship with the KPLC is reinforced by mutually beneficial financial ties.

Ministry of Water Development. As indicated above, TARDA depends on this ministry for most of its hydrological data, and is assisting the MOWD with improving the quality of hydrological data collection in the basin. It also collaborates with the MOWD in decisions about the apportionment of water in the basin. The apportionment boards are formed on a catchment basis, and while the MOWD is the lead institution on the board, TARDA also is represented and participates in decisions about water allocation in the Tana. In the future, coordination between MOWD and TARDA is likely to improve, since the new Managing Director of TARDA

worked for several years at the MOWD, participating in the development of the country's national water plan.

Ministry of Agriculture (MOA). TARDA is currently coordinating its soil conservation and catchment activities with the MOA. This program of TARDA's is too recent to evaluate if actual collaboration has taken place. TARDA generally has only been involved in the irrigation component of the agriculture sector, and has left the planning and implementation of soil conservation and rainfed agriculture activities in the basin to the Ministry of Agriculture. While TARDA's new ten year plan gives attention to soil conservation activities, it does not provide funding for rainfed agriculture work. The desire to work on rainfed agriculture in the basin has been expressed by TARDA officials, but it is unlikely to take place, except at a very modest level, in the near future.

Within the Ministry of Agriculture, TARDA has worked closest with the Irrigation and Drainage Branch (IDB) (formerly the Small-Scale Irrigation Unit), assisting with planning, project identification, and feasibility studies. In working with IDB, TARDA has come closest to fulfilling its official mandate to advise institutions on water use activities in the basin and to assist them with planning and feasibility studies. TARDA carried out the initial feasibility studies for the Kibirigwe small-scale irrigation scheme, and then turned over implementation and

management responsibilities of this project to the IDB. TARDA also was involved with the feasibility studies of the Lower Tana Village Irrigation Programme, which is another IDB scheme, but in this case the involvement was less extensive than at Kibirigwe.

Though TARDA seems to liason well with IDB, the activities of the two institutions are not always complementary. For example, in the lower Tana TARDA's proposed large-scale irrigation scheme is likely to make obsolete the IDB's Village Irrigation Programme (VIP). The TARDA prject will compete for scarce labor with the village schemes, and will force the displacement of herders and farmers in the delta, who may resettle in the villages and compete for scarce water and irrigable land there. IDB is aware of the proposed TARDA scheme, but it has been unable to have an impact on TARDA's plans, except to ensure that the scheme's gravity-fed canal provides water to the VIP (for a description of the VIP, see Appendix II).

4.2. Cases of Poor Institutional Collaboration

District Development Committees (DDCs). TARDA's record of dealing with the District Development Committees has been mixed. On the positive side, TARDA has completed (or is in the process of completing) several district-based resource inventories, which the DDC's can utilize for planning purposes. As of November 1986, TARDA had finished approximately five of these district

profiles, and was working on additional ones. The staff at TARDA eventually hopes to have full coverage of all Districts in the Tana and Athi basins. The district reports provide good data on natural resource availability, land use potential, and climatic patterns.

On the negative side, TARDA has not always been sensitive to existing programs of the DDCs. The scale of funding for TARDA's programs are so much greater than those of the DDCs, the authority is unlikely to seek cooperation with DDCs unless it is absolutely necessary. In the case of the proposed Delta Irrigation Scheme, the DDC of the Tana River District did not participate at all in the planning of the scheme, even though the implementation of the project will greatly alter the district's economy and ecology. Communication between TARDA and the Tana River District DDC was so poor that the MP of Tana River District had to approach TARDA directly (in Nairobi) to inquire about the project. In other cases, TARDA appears unaware of district-level projects and of the development priorities of the DDCs in the basin. As indicated earlier in the paper, TARDA views its mandate as planning for and implementing national development projects (e.g., hydropower schemes), and thus is unlikely to involve DDCs in many of its activities unless it is absolutely necessary.

National Irrigation Board. As we discussed earlier in the paper, a member of the National irrigation Board sits on the TARDA interministerial committee. The activities of the two parastatals, however, have been managed almost totally independent of the other, although they are two of the largest institutional users of the basin. TARDA approached the NIB irrigation scheme at Bura very cautiously, and provided very little assistance in its planning. Similarly, TARDA has not sought NIB advice in the planning of the Delta irrigation scheme, nor is it likely to in the future. TARDA, however, is planning to carry out a water resources study of the Thiba tributary of the Tana river, which is the most overused of the tributaries supplying water to the NIB scheme at Mwea.

Part of the lack of collaboration between TARDA and NIB may relate to the fact that two of NIB's major schemes on the Tana--Mwea and Hola--were begun almost 20 years prior to TARDA's establishment. Another reason may be TARDA's own desire to be involved in the implementation of large-scale irrigation projects, which until recently have been carried out by the NIB. The NIB has been under considerable pressure within government to reform its irrigation program, and thus it is unlikely to be able to expand its program without considerable opposition. Official disfavor with NIB is related to the parastatal's disastrous results at the Bura. TARDA has an opportunity to expand its role in the irrigation sector due, in part, to the official

disenchantment with NIB, and to its recent success in acquiring foreign aid (Japan) for irrigation development.

Non-Government Organizations (NGOs). In spite of the large number of NGO activities in the Tana basin, TARDA has had virtually no liason with them. The NGOs are involved with small-scale irrigation projects in the lower and middle Tana, especially in the Garissa area, where they are the major institution involved in irrigation. The irrigation activities of the NGOs have already been affected by the reduction in flood levels at Garsen and Garissa, which has resulted from the construction of the Masinga dam. To our knowledge, the NGOs were never advised about the effects that river regulation in the upper and middle Tana would have on their projects.

The lack of communication between NGOs and TARDA is not solely the fault of TARDA. Until the recent creation of DDCs, Kenya has not had an institutional mechanism where NGOs could be represented in official planning excercises. Thus NGOs tended to work totally outside of any liason with government, a trend that continues in many parts of the Tana basin. For many NGOs, the lack of formal communication with government is favored because it allows them to work free of bureaucratic constraints and to implement projects quickly.

Local Authorities (Municipalities and County Councils). TARDA has not involved local bodies in the planning of basin activities, and have turned to them only when necessary. For example, TARDA is using County Councils to funnel compensation funds to farmers being relocated because of the construction of the Kiambere dam. The land in the Kiambere area is mainly trustland, which is held by the County Councils. TARDA has involved the County Councils in this case to help with the implementation of the agency's resettlement program, but has not sought their input on general planning and development issues.

The lack of a representative of the Ministry of Local Government on the TARDA board inhibits linkages between local bodies and TARDA. While representation on the board does not guarantee better liason, it does at least allow a ministry (if it chooses) to be involved in planning decisions at the Nairobi headquarters, where most basin decisions are made. Perhaps the most salient case of poor communication between TARDA and the local bodies has been regarding the planned Nairobi water scheme. In this case, the Nairobi municipality has proposed to construct a dam and reservoir on a tributary of the Tana in the upper Tana area. To our knowledge, the municipality, which has worked closely with the Ministry of Water Development on the project, has not been in contact with TARDA. Given the scale of the water scheme, which will more than double the amount of water supplied to Nairobi from the upper Tana, the lack of communication is

unfortunate. The extraction of such a large amount of water in the upper Tana could affect TARDA's own plans for water resource activities in the area.

Agricultural and Ranching Cooperatives and Water User

Associations. TARDA has virtually no official contact with institutions at the local level, including cooperatives and water user associations (i.e., small-scale irrigation committees). Nor does TARDA liason with the national ministeries, such as the Ministry of Cooperatives or Ministry of Culture and Social Affairs, representing these organizations.

Among the different local institutions in the Tana basin, perhaps the weakest are those representing the interests of livestock producers--the Company, Cooperative and Group ranches. Despite the importance of the livestock sector to the economy of the Tana basin, the interests of herders are often neglected in favor of irrigation and other interests, which are represented by stronger institutions. In the Tana basin, there are six company (3) and group ranches (3) and one cooperative ranch, which are all located in Tana River District. Only the company and cooperative ranches are presently functioning, and even these are experiencing considerable economic and administrative difficulties. Most of these ranches rely heavily on outside management and technical assistance.

The lack of secure tenure for herders in the Tana basin impedes the development of viable herder cooperatives and group ranches. In other areas of Kenya, such as the Maasai Districts, group ranch organizations have been able to exert considerable influence on development activities because they control land allocation decisions. By contrast, in the middle and lower parts of Tana River District, most of the land is state land, rather than trust (owned by the group) or private land, which means that the central government has total authority to allocate land as it deems appropriate, without compensation to herders. Legally, herders in most parts of Tana River District are "squatters", and can be removed from the land without any legal recourse.

Not surprisingly, the interests of herders have not been incorporated into TARDA's plans for the lower Tana (see Appendix II). The proposed Delta Irrigation Scheme of TARDA will disallow herder access to critical grazing zones in the delta, and will jeopardize the livelihood of more than 10,000 herders who utilize the lower Tana. Herders have voiced their disapproval of the TARDA plans to the Tana River District DDC, but they are unlikely to succeed in altering TARDA's plans. As we noted above, TARDA does not view cooperation with DDCs as an important part of its development mandate.

Ministry of Environment and Natural Resources and Other National Environmental Institutions. There is no legal requirement in

Kenya that environmental impact studies be conducted for development projects. In only one case did TARDA commission an environmental impact study for a project--the Kiambere dam--and that was only because of pressure from donors funding the scheme. As we mentioned earlier in the paper, the Ministry of Environment and Natural Resources was not involved in this study, but rather TARDA was the responsible agency.

TARDA has collaborated with the Ministry of Environment and Natural Resources (and perhaps the National Environment Secretariat) in its catchment protection and reservoir reforestation efforts. It is likely to continue this collaboration, because MOENR is the responsible institution and environmental protection is needed to secure TARDA's hydropower investments.

Most of TARDA's large schemes have serious, possibly irreversible impacts on the environment, but environmental organizations are rarely consulted by TARDA. Only one case are we aware of where pressure brought by a Kenya institution was able to alter a development project of TARDA. The National Environment Secretariat (NES) is said to have halted plans for the establishment of a tannery near the Masinga reservoir, which would have damaged water quality in the area. NES was able to convince TARDA not to proceed with its plans, but it did this through recourse to official or legal means.

4.3. The Role of Donors and Expatriate Firms

At least part of the reason for the poor coordination among institutions working in the Tana basin can be blamed on foreign donors and the expatriate firms that they hire. There have been several different donors operating in the Tana basin, some of them working directly with TARDA while others have not. Table 7 lists the different donors that have been responsible for activities in the Tana basin. Among those listed in the table, the most important have been the World Bank, Dutch Aid, British Aid (ODA), and the EEC. These donors, as well as the others listed in the table, have their own administrative procedures, requirements, and management style, which often are inconsistent with Kenya institutions, including TARDA. Certain of the institutions, such as the Irrigation and Drainage Branch, have been so dominated by foreign donors that their structure heavily reflects the structure of the donor. Collaboration with and among donors in the Tana basin is almost as important as collaboration among Kenyan institutions.

The heavy reliance on foreign aid to finance development activities in the Tana basin results in three problems for Kenyan institutions: (1) foreign donors employ their own expatriate firms and personnel, which stifle the development of Kenyan personnel within local institutions; (2) the scale of funding for

THE ROLE OF DONORS IN TANA BASIN DEVELOPMENT

Table 7

Donor	Activities	Approximate dates
Japan World Bank	Delta Irrigation Scheme Bura Irrigation Kiambere Dam Village Irrigation Programme	1987-present 1978-present 1985-present 1983-present
DANIDA (Danish Aid)	Gerissa Irrigation	1970-present
EEC	Masinga Dam Kiambere Dam	1978-82 1985-present
German Aid (GTZ)	Mitunguu Dam Masinga Dam Kiambere Dam	1983-present 1978-82 1985-present
ODA (British Aid)	Technical Assistance to TARDA Masinga Dam Gitaru, Kamburu & Kindarum Dams	1974-77 1978-82 1966-1979
UNDP	Irrigation Sector Survey River Basin Authority Study	1968-69 1971
Dutch Aid	Village Irrigation Programme Kibirigwe Irrigation Scheme Delta Irrigation Studies (TARDA) Environmental Impact Study of Delta Irrigation River Morphology Study Computer Simulation Model (TARDA) Irrigation and Drainage Branch Small-Scale Irrigation Unit	1983-present 1980-1985 1982 1985 1985-87 1986-87 1977-present

certain donor projects is so great that it not only creates indebtedness, but makes it almost impossible for Kenyans to maintain and manage the project after the donor withdraws; (3) because donors often do not communicate with each other or with Kenyan institutions that they are not directly affiliated with, their presence greatly complicates TARDA's task of coordinating river basin development.

Constraint to Manpower Development. TARDA was originally staffed by four expatriate technicians (funded by ODA), who worked under a Kenyan Managing Director and with Kenyan counterparts. Since the late 1970s, TARDA has not staffed its general professional positions with expatriates, but foreigners have been employed in special project cells, such as the Kiambere dam unit. As we discussed in Section (2) of the report, TARDA still depends on expatriates for most of its hydropower feasibility and design work. In terms of hydropower schemes, TARDA only has the capacity to conduct prefeasibility work and to draw up the Terms of Reference for feasibility and design work.

Both of TARDA's dams have been financed by a complex network of donors, with the EEC being the lead institution for the Masinga Dam and the World Bank for the Kiambere Dam. Much of the pre-investment work on these dams was done by a UK-based engineering firm--Watermeyer, Legge, Piesold, and Uhlman--contracted by the donors. The engineering firm did not work with

any Kenyan firms, but it did coordinate the work with officials at TARDA. Unfortunately, none of the donors who funded the work of expatriate firms insisted that the expats train TARDA counterparts, in order for them to eventually do the work themselves. Despite the allocation of millions of dollars on detailed feasibility and design studies for hydropower, the work has done very little to improve TARDA's capacity to carry out design work.

The initial pre-feasibility work for the Delta Irrigation Scheme was carried out by TARDA, but because of the large costs of carrying out feasibility and design studies for the scheme it had to seek donor assistance. The Dutch agreed to fund the feasibility studies, but insisted that the work be done by a Dutch firm. Unlike the feasibility work for hydropower projects, TARDA does have considerable in-house capacity to carry out work on irrigation, as exemplified by its efforts in the upper Tana and at Kibwezi. Because of donor constraints, TARDA's role in the feasibility studies of the delta irrigation project was limited to drawing up the initial Terms of Reference for the studies; it participated very little in the actual studies. An inherent problem of dealing with expatriate firms is that they are likely to be more responsive to the funding organization (donor), than to the host institution.

Manpower development at TARDA does not seem to have suffered as much as it has at other Kenya institutions, which have relied heavily on donor support. The IDB has been especially dominated by a single foreign donor (Dutch Aid), which has inhibited the development of local Kenyan managers at the institution. The donor has placed several expatriate advisors in key positions at the national, provincial, and project levels of the IDB. Until recently, Dutch Aid placed expatriates at Kibirigwe, carrying out managerial and professional work that, in some cases, could have been done by Kenyans. The prolonged involvement of Dutch advisors at Kibirigwe retarded the take over of the scheme by the Kibirigwe Farmers Cooperative, denying this organization valuable managerial experience.

Similarly, the considerable Dutch presence at the Village Irrigation Project (based at Minjila) has stifled the development of the IDB staff. As with many donor projects, the expatriate advisors at Minjila have access to better logistical support than their Kenyan counterparts, allowing them to be more effective in the field and to take the lead on project activities.

In sum, it is difficult to gauge the right mix of expatriate and local expertise on a development project, especially when real manpower constraints exist within local institutions. In the case of the IDB, the expatriates have worked very hard, but

their efforts have tended to keep Kenyan managers in the background. That Dutch Aid recognizes this as a problem is reflected in their new irrigation program, which will greatly curtail the number of advisors in the IDB.

Excessively Expensive and Complex Development Programs. The Tana basin has experienced some of the most expensive, donor-funded development "experiments" in Kenya. Most noteworthy is the World Bank-funded Bura Irrigation Scheme, but less publicized and on a different scale, are the very expensive donor projects (on a per hectare basis) at Minjila, Kibirigwe, and Mitunguu. These projects are not replicable without excessive external subsidies, nor are they easily maintained on a recurrent basis by Kenyan institutions. These programs tax the host institution's managerial and financial capabilities when donor support is withdrawn, and help to maintain Kenyan dependence on foreign aid. In the Tana basin, even "small-scale" irrigation schemes have been fashioned according to donor preferences, and are inconsistent with local economic and institutional realities (cf. Kimani 1987).

TARDA has been mainly involved with very expensive, capital-intensive development projects that require high levels of donor support. In this context, the donors and their expatriate firms have been able to exert considerable influence on TARDA, without necessarily assisting the institution to develop its own

capabilities. An example of this is the initial river basin model that was constructed by expatriates at TARDA in the mid-1970s. This model was recently updated, but because of the complexity of the exercise, donor funding was sought, and another expatriate firm brought in to do the work. Thus in a ten year period of dealing with the simulated model, TARDA was not able to update the original model. It should be noted that in this case, it is not known whether or not TARDA actually had the capacity to update the model, or whether the donor insisted on the use of an expatriate firm.

Lack of Coordination Among Donors. Donors are such important institutional actors in the Tana basin that coordination among themselves is essential for river basin development. Except in cases where more than one donor have collaborated on a specific project, donors in the Tana basin have tended to work independent of each other. This has resulted in projects that are not mutually reinforcing and, in some cases, strongly contradictory to each other. For example, Japan Aid is proceeding with its plans to finance a large-scale irrigation scheme in the Tana delta, although it conflicts with the existing Dutch Aid program in the same general area. Surprisingly, the Japanese Volunteers Service has placed an individual to work on improving recession cultivation in the delta, although the Japanese government/TARDA proposed scheme in the delta is likely to disrupt this form of agriculture.

The complex web of donor programs in the Tana basin is such that coordination within specific donor organizations even can be difficult. For example, Dutch Aid funded a river morphology study for TARDA, which its advisors posted at IDB were unaware of, although the latter group recognized the importance of the study for their program. The study should provide data on the effects of regulatory dams in the upper Tana on flood frequencies in the lower Tana, where the Dutch/IDB are funding an irrigation program. The lack of communication among different Dutch-funded programs points to the problems of donor coordination in the basin.

The lack of communication among donors regarding their projects in the Tana inhibits collaboration among Kenyan institutions. The local institutions are closely tied to the donor that supports them (an exaggerated case is the IDB) and if the supporting donors do not collaborate then it impedes the respective Kenyan institutions from doing so.

5. LESSONS BASED ON THE TANA BASIN EXPERIENCE

This section summarizes the main points of the paper and lessons of the Tana experience that may have relevance to African river basin development. The comments are mainly limited to the experiences of TARDA, which is the primary institutional actor in the basin.

5.1 Successful Development of Hydropower

The rapid development of hydropower sources in the Tana basin since the 1960s was related to Kenya's precarious dependency on Uganda energy. The role that this relationship had in motivating the development of the basin's resources must be acknowledged.

In terms of making the country less dependent on imported electricity, TARDA has truly been successful, as witnessed by an approximate increase of three-fold in Kenya's energy self-sufficiency since the 1960s. Beginning with less than a ten percent contribution to the country's electricity supply in the 1960s, the Tana's hydropower schemes presently account for approximately 50 percent of the country's electricity. If the sole objective of TARDA was to develop the hydropower potential of the basin, then it can be judged a success.

5.2. Lack of a Master Plan Has Hindered Integrated Basin Development

TARDA was established with a broader mandate than merely to develop the basin's hydropower potential. It was to coordinate and plan for the development of the region's water, land, and

human resources. Yet because the agency has never produced a master plan for the basin, TARDA and other institutions working in the basin have tended to plan and implement on a project by project basis. Basin activities, therefore, have not always reinforced each other and, in many cases, they have been profoundly contradictory. This is most apparent in the failure to assess the impact of river regulation in the upper basin on land and water use systems in the lower Tana.

5.3 TARDA's Emergence as an Implementing Agency

TARDA was not originally established to implement projects, but rather it was suppose to plan, monitor, and evaluate river basin activities that have been implemented by other institutions. It was also expected to mediate water use conflicts among competing institutions and interests in the basin. When TARDA became involved in project implementation in 1977, it could no longer serve as an "impartial" mediating body in the basin. It created its own alliances with institutions and donor agencies, in order to assist with the funding and implementation of TARDA activities.

The importance of project implementation at TARDA increased considerably in the 1980s, with the funding of the Kiambere Dam and the proposed delta irrigation project. This emphasis on implementing large-scale, capital intensive projects has reduced TARDA's credibility as a mediating agency, as well as diminished the agency's focus on planning (TARDA has never been involved with monitoring and evaluation activities) (cf. Kimani 1987).

Rather than mediating conflicts of other institutions in the basin, TARDA itself is now responsible for many of the major development activities in the basin, which themselves have resulted in land and water use conflicts.

5.4 TARDA Has Not Served as a Coordinating Institution

TARDA has not facilitated nor strengthened relationships among institutions in the Tana basin. It has worked well with certain institutions, such as Kenya Power and Electricity Company, but in most cases it has not collaborated with other organizations; nor has it served as an "umbrella" organization under which other groups could interact and coordinate activities.

5.5 Development of Analytical Capacities at TARDA

TARDA's capacity to carry out its own feasibility and design work clearly has improved since its initial inception. This has been most evident in the irrigation sector, where much of the recent analytical exercises have been carried out by TARDA staff. Because TARDA has been able to offer higher salaries and better fringe benefits than other government organizations, it has been able to recruit and maintain a high quality professional staff. Even in cases where outside assistance must be sought for a particular study, TARDA often does the prefeasibility work and draws up the Terms of Reference.

5.6 Donors and River Basin Development in Kenya

The lack of integrated planning in the Tana basin is related, to a large degree, to the heavy involvement of donors.

River basin projects (i.e., hydropower and irrigation schemes) are by their very nature expensive. They often require considerable donor funding, which allows the donors considerable influence in basin activities. The Tana has not been an exception to this pattern. Donors have played a major role in basin activities and have been able to dominate many of the institutions responsible for Tana basin development. While their influence has been stronger on other institutions (e.g., IDB), they clearly have played a major role in affecting the TARDA program.

The heavy reliance on foreign aid to finance development activities in the Tana basin results in three problems for Kenyan institutions: (1) foreign donors employ their own expatriate firms and personnel, which stifle the development of Kenyan personnel within local institutions; (2) the scale of funding for certain donor projects is so great that it not only creates indebtedness, but makes it almost impossible for Kenyans to maintain and manage the project after the donor withdraws; (3) because donors often do not communicate with each other or with Kenyan institutions that they are not directly affiliated with, their presence greatly complicates TARDA's task of coordinating river basin development.

5.7 TARDA as a Model for Basin Authorities in Kenya

TARDA has served as the institutional model for other river basin authorities in Kenya. The legislation that created the new authorities has been based on the TARDA model. These agencies

have been able to learn considerably from TARDA's early successes and mistakes. The Lake Basin Authority, for example, has recognized the problem of coordinating development without a master plan, and thus one of its first major activities has been to produce an integrated plan. The TARDA experience has revealed that planning without a master plan inhibits integrated basin development.

5.8 Poor Collaboration Between TARDA and Local Institutions

TARDA views its role as planning and implementing national development projects, where favorable benefit/cost ratios at the national level are more important than positive returns at the regional or local levels. Its projects are also very expensive, which makes coordination with local institutions, which often are poorly funded, even more difficult. TARDA has shown some willingness to work with District Development Committees, but not in terms of soliciting their input in basin planning exercises. Other than the District Development Committees, there are really no other local institutions that could serve as effective "linking" institutions between local communities and TARDA. Under its present structure and portfolio of activities, TARDA is unlikely to increase its collaboration with local institutions in the basin. Given its increased emphasis on the implementation of large-scale projects, TARDA increasingly is likely to enter into situations of potential conflict with local institutions and producers, and continue to fail to capitalize on the development potential (at considerably less financial cost) of these groups.

NOTES

1. The agro-ecological zones (based on the Kenya classification system, see Jaetzold and Schmidt 1983) covered by the Tana basin are:

The coconut-cassava (annual rainfall in excess of 1000 mm) and coastal cashewnut-cassava zones (800-1000 mm) in the extreme southeasterly portion of the basin (less than five percent of basin);

The livestock-millet and ranching zones in the area between Garsen and Mbalambala (400-650 mm)--most of the middle and upper Tana River and Garissa Districts;

The cotton and sunflower-maize zone in lowland parts of Embu, Meru, and Kirinyaga Districts, including the Mwea plains (650-800 mm); and

The coffee-tea zone of the upper Tana basin, including highland parts of Kiambu, Murang'a, Nyeri, Kirinyaga, and Embu Districts (annual rainfall in excess of 1000 mm).

2. It should also be noted that Mwea had relatively easy access to the Nairobi Market, where most of its rice was sold. Hola, on the other hand, produces a commodity (cotton) that is marketed by a parastatal based in Nairobi, and one which has a record of being among the most inefficient marketing boards in Kenya.

3. The advent of independence in 1963, of course, had a significant effect on institutions in the Tana basin. This historical event is discussed earlier in the text in relation to upper Tana institutions, but because its occurrence was not specific to the Tana it is not dealt with in this section.

4. For example, during the 1984 drought many parts of the lower Tana remained self-sufficient in basic foodstuffs, and did not require food relief.

5. Because the planning of development activities on the Athi basin has only recently begun, this report is mainly restricted

to the Tana basin. Field research in 1985 and 1986 was conducted only in the Tana basin.

6. That economic feasibility studies for Masinga only justified the construction of a multi-purpose dam may explain, at least in part, TARDA's interest in irrigation. In order to secure funding for the dam, TARDA had to show a commitment to irrigation development in the future. Moreover, the threat to TARDA's hydropower investments caused by siltation in the upper catchment may explain the agency's new interest in soil conservation and reforestation activities. Thus, the diversification into irrigation and environmental activities is related, at least in part, to TARDA's hydropower program.

7. This term comes from Eileen Berry's presentation at the SARSA river basin meeting at Clark University in February. As we interpret the term, it refers to an institution that facilitates linkages between two or more institutions, which in this case is between a national agency (TARDA) and local organizations.

**APPENDIX I BRIEF DESCRIPTION OF TANA BASIN INSTITUTIONS
(EXCLUDING TARDA)**

There are several public and private institutions that have been involved in development activities in the Tana basin. They are found at national, regional, district, and local levels. The interests of producers and different economic interests (government, private commercial, and small-scale farmers and herders) are represented and mediated through a plethora of institutions, which vary considerably in their importance and the economic resources they can mobilize. There is little question that to date national-level institutions (mainly parastatals) have had the greatest impact on development activities in the basin. Below we describe and summarize the activities of some of the most important institutions, in addition to TARDA, that have been involved in Tana River basin development.

1. National Irrigation Board (NIB)

This parastatal was established in 1967 and took over responsibility for the management of the ALDEV schemes established in the 1950s. It is a highly centralized organization with its headquarters in Nairobi and a centralized management structure at each of its schemes. With the important exception of Mwea, virtually all of its schemes have had low, and

often negative, economic rates of returns. Until recently when Bura was removed to the Ministry of Agriculture, NIB was responsible for all large-scale irrigation in the Tana basin. The proposed Tana delta irrigation scheme is to be under the management of TARDA, rather than NIB.

At the scheme-level, NIB has an organizational structure allowing very little farmer participation in planning, management, marketing, or maintenance. Producers are told what to grow, the area to be cultivated, costs of water and other services, and the crop prices to be paid (which in many cases are determined at the national level). Farmers work on the basis of one year tenancies which must be renewed annually, and which can be taken away if Scheme management determines that performance criteria have not been followed. Farmers have organizations and cooperatives that often serve as savings, credit, and investment companies. They do express farmer concerns to the Scheme management, but in reality they play very little role in Scheme decision-making. The Mwea Amalgamated Rice Growers Coop Society is a good example of a credit and investment cooperative that actually plays very little role in the management and decision-making of an NIB scheme. It has considerable assets, however, including ownership of more than 50 percent of Mwea Rice Mills, ownership of retail stores and commercial buildings, and of transport companies. It also serves as a bank for members and is an important source of credit in the area.

The future role that NIB will play in Tana irrigation activities is unclear. It is unlikely to be responsible for the planning and management of any new irrigation initiatives in the area, and it is possible that its role in existing schemes at Mwea and Hola could be greatly reduced.

2. Irrigation and Drainage Branch (formerly Small-Scale Irrigation Unit), Ministry of Agriculture

This central government organization has a number of small-scale irrigation activities in the Tana basin. The organization was established in 1977 with the following objectives (quoted from Coward et al. 1986:12):

--to keep the cost the cost of irrigation to an absolute minimum by employing low-cost technology as much as possible and by inducing farmers to contribute toward this development by providing at least one or two days of free labor;

--to involve the farmers in the planning and construction of "their" system in order to educate them on the function of the various structures in order to enable them to operate and maintain the system on their own afterwards, and to impart some sense of ownership and control;

--to emphasize the organization of farmers into water users' associations able to carry out routine operation and maintenance activities; and

--to limit the agency's role to technical design and construction, enabling it to move elsewhere after construction.

The degree to which it has achieved these goals is difficult to determine. In the Tana basin, IDB has been mainly involved at Kibirigwe, Mitunguu, and the lower Tana Village Irrigation Project. Since these projects have all had strong donor influence, which has provided much of the technical expertise and management until recently, the capacity of IDB to follow its mandate is unclear. In general, of all government organizations involved in the Tana, IDB has perhaps the greatest potential for designing economically viable projects that benefit small farmers.

3. Non-Government Organizations (NGOs)

NGOs have been active in the small-scale irrigation sector in the Tana basin. They were responsible for the first small-scale schemes in the Garissa and lower Tana areas, and still play an important role in many of the schemes. Particularly church-affiliated organizations have taken a lead in

supporting small-scale irrigation. At present the NCKK (National Christian Council of Kenya) is collaborating with IDB in the Village Irrigation Project (VIP) based at Minjila (lower Tana). The NCKK has had the prime responsibility for organizing and assisting farmer committees (Kenya's equivalent of water user associations) at the VIP schemes. It has posted an excellent extension person in Garsen to work with farmer organizations. Among the important innovations the NCKK person has initiated is a revolving maintenance fund for two of the schemes, whereby irrigators have to pay collectively Ksh 12/50 for every hour of pump operation. The schemes have opened bank accounts in Malindi and can earn interest on the funds until such time that they need to buy replacement equipment, spare parts, and other maintenance items. Beyond the level of the water user associations and the schemes, the NGOs do not seem to figure at all in the planning of development activities in the Tana basin. If the recent emphasis on District-based development leads to greater autonomy for district development committees (DDCs) vis-a-vis TARDA, NIB, and national line ministries, and allows them to participate more in development planning in the basin, then some of the innovative work of NGOs may have an impact on policy and project design and planning (the NGOs are represented on each of the DDCs).

4. Company, Cooperative, and Private Ranches

There are 3-4 large private ranches in the lower Tana area.

Some of these are as large as 12,000 hectares and are owned by a single family. One of the largest is the Bujarat ranch in Lamu District, which in addition to having 4,000-5,000 cattle, has 40 acres of cultivated cotton and a considerably larger area (unknown) under mango, citrus, sesame, and cashew production. There are also three company ranches, one co-operative ranch, and three group ranches (in the upper part of the Tana River District). Only the company and co-operative ranches presently are functioning, and even these are experiencing considerable difficulties. The ranches have been financed by the Agricultural Finance Corporation, and rely heavily on outside management and technical assistance. The company ranches are directed agricultural companies (DAC), which means that management is at least partially under the control of a Ministry of Agriculture and Livestock Development (MALD) employee residing on the ranch. One of the ranches is predominantly owned by Pokomo, while the others are mainly owned by Orma.

Despite the importance of the livestock sector, herders are represented by the weakest institutions in the area, and partially because of this their interests are often neglected in favor of irrigation and other interests. The group ranch organization, which has had considerable problems elsewhere in Kenya, has at least allowed herders to protect their land rights against competitors and given them a vehicle for expressing collective interests. In the middle and lower parts of Tana River District, most of the land has been declared state land

rather than trust land (owned by the group) or privately-owned land, which means that the central government has total authority to allocate land as it deems appropriate. Group ranches cannot be established in such areas.

In theory, the herders of the middle and lower Tana River District can be classified as "squatters", and be removed from areas without any legal recourse. In part, the uncertainty of the tenure situation has not allowed effective herder institutions to develop, even among the ranches, which to date have not been allocated leasehold titles.

5. Farmer Organizations

There are several types of farmer organizations in the basin, ranging from irrigation committees of 12 members to large scheme cooperatives of several thousand, such as at Mwea. A comparative analysis of their strengths and weaknesses, including to carry on sustained production and marketing activities, is badly needed.

6. District Development Committees

The recent emphasis on district development is likely to make DDCs increasingly important in the development of the Tana basin. They have to date played only a very small role in the planning of development activities in the basin. Thus national

decisions, such as the recent one to initiate a very large irrigation scheme in the lower Tana, seem to be made without consulting the DDCs, or at least to be made without considering the implications of a national project on district development.

The DDCs have played an important role in some of the smaller activities, such as small-scale irrigation. They have made available small grants to scheme committees to purchase pumps and other equipment. An important question to explore in the upcoming fieldwork on the Tana is the degree to which DDCs will be able to assume more importance vis-a-vis the large planning agencies, such as TARDA. The district-based organizations are more likely to support smaller investments, with considerably higher rates of return and better opportunities for farmer participation, than are the larger bureaucracies, such as NIB and TARDA.

APPENDIX II. TWO CASE STUDIES OF DEVELOPMENT ACTIVITIES IN THE LOWER TANA

This section draws heavily on fieldwork conducted by the authors in November 1985. Emphasis here is given to activities that are illustrative of the range of projects and programs in the basin.

1. Village Irrigation Project, Lower Tana

As noted above, small-scale irrigation schemes in the lower Tana were first started in the 1960 by NGOs. Some of these later received support in the early 1970s from the FAO-funded Minor Irrigation Programme, a national irrigation programme. The project that we are addressing here began in 1981 and is expected to end in 1987. It is financed by the World Bank and Kenya government, with the Dutch government providing technical advisors. The project deals mainly with the rehabilitation of these earlier schemes, including the creation and strengthening of the farmer committees that are supposed to manage and maintain them. During most of 1982 the VIP focused on the rehabilitation of Mnazini (c. 30 hectares), and during 1983-84 it rehabilitated and slightly expanded the Hewani scheme (from 28 to 33 hectares). The project is currently working on Wema scheme (60 hectares) and in 1986-87 the project intends to rehabilitate Oda and Ngao schemes.

The VIP has several working principles to ensure farmer commitment and participation:

--the farmers of the scheme must have organized an irrigation committee and actually sought assistance from VIP before their scheme will be considered by the project (this we were not able to verify; but it seems that VIP has actively solicited support from some communities [Ngao] to be involved in the programme, rather than vice-versa);

--the farmers must do their own leveling of plots;

--the farmers must provide labor to help with the design and surveying of the scheme; and

--the farmers must contribute labor toward the maintenance of canals and funds toward the purchase of fuel and spare parts.

There are several other requirements of the project whose responsibility of enforcement lie with the farmer's scheme committees, but which seem to have been initially determined by VIP. These include the requirement of rice cultivation during the long rains (farmers can grow what they wish during the second rains), and the requirement that rice yields must be weighed after harvest at the village store, although the farmer is free

to market surplus wherever s/he wishes.

The VIP is a small-scale irrigation programme in terms of land size (most schemes are less than 40 hectares) and perhaps in terms of management, although regarding the latter it is still too early to determine whether the government will successfully turn over all management functions to the scheme committees. But in relation to costs, the VIP more closely resembles a capital-intensive, large-scale irrigation scheme. Capital development costs for rehabilitation of existing schemes have been close to \$20,000 per hectare. Given that farmers are growing subsistence crops on one acre plots, the costs are particularly disturbing.

The VIP experience raises a number of questions that are likely to be of concern to future development activities in the Tana basin. These include:

--how can the costs of small-scale irrigation schemes, especially those utilizing pumps, be kept down? Should pump schemes be avoided in all cases?

--should market considerations play a dominant role in determining the feasibility of small-scale irrigation in the Tana basin, given that many site locations are remote from urban and other markets. Where capital costs are high, should the emphasis

be on food crops (e.g., maize and rice) to enhance local food security, or on high value crops for export to urban or international markets (Merryman [1984] notes the irony of one small-scale irrigation scheme in Garissa that was established to enhance food security, but because of high costs was forced to emphasize cantaloupe production for a lucrative, select market in Nairobi)?

--are the presence of expatriate advisors in the field necessary for small-scale irrigation projects, especially since their presence greatly accelerates project costs (the Kibirigwe project is a good case where expatriate management may have remained longer than was necessary)?

--is a large, gravity-fed canal to supply water to small irrigation schemes in the lower Tana a feasible alternative to pump irrigation in the area?

--how can projects like VIP also support recession and flood irrigation systems, such as those found near Kipini?

--how can small-scale irrigation projects better integrate livestock production in their schemes? How can the interests of herders, who make up the majority of population in Tana River District, be better served in irrigation programs?

--How can problems of maintenance and non-standardization of

equipment be addressed in projects like VIP? Because of the wide range of equipment and different manufacturers of pumps, the VIP has suffered from lack of spare parts, and the inability to use parts from one pump to repair another (some of these problems are not due to VIP, but stem from the earlier period when different NGO schemes used different machinery)?

--at what point in the development of VIP schemes should government and donors pull out of management and maintenance activities? Has the engineering and technical designs of the schemes precluded local farmer committees from ever assuming full maintenance responsibilities for the scheme (this may be more of a problem with the sprinkler schemes, such as the one at Mitunguu in the upper Tana basin)?

These are issues that are not only specific to VIP, but in many cases are also valid for other small-scale irrigation schemes that we examined.

2. Livestock Development

Livestock marketing and ranching activities in Tana basin have received support under the World Bank-financed Kenya Livestock Development Program (Phases I and II). Holding grounds at Karawa and Wenge have received support, and several ranches have received credit and technical assistance under the program.

Yet as we indicated above, the strengthening of the livestock sector and its representative institutions have lacked far behind the agricultural sector of Tana River District, and there seems to have been a neglect of the importance of the livestock sector in the middle and lower Tana areas in reports and project feasibility studies (e.g., Haskoning 1982). Perhaps part of the reason for this is because the economic benefits of the area's livestock sector have only been examined in a local or District context, rather than in terms of provincial (i.e., Coast Province) and national economies.

As I noted above, the Tana River District has one of the largest concentrations of cattle in all of Kenya. It (in combination with Garissa District) provides in most years up to 50 percent of the meat for consumption in Mombasa, Kenya's second largest city and its most important port (Ominde 1971:158). Tana River District is all a major supplier of meat for the Kenya Meat Commission (KMC) cannery in Mombasa. Garsen Division alone exports 2,000-3,000 cattle per month to the KMC facility.

In addition to serving as a major supplier of meat to other areas, the lower and middle Tana are also a major source of immature cattle for ranches in Taita and other coastal districts. Some large commercial ranches, such as Galana, buy immatures for breeding and fattening from the Garsen area 2-3 times per year. Taita District ranches buy less frequently, but still depend

heavily on Tana supplies. In one auction alone (November 1985), we recorded at Garsen more than 945 cattle being sold to commercial ranch managers from Taita. Official statistics on final sale and consumption of these cattle will show Taita as the supply source, and will not indicate that they had originally come from the Tana area.

Not surprisingly, local herders in the lower Tana have not been enthusiastic supporters of irrigation development in the area, since it removes pasture and grazing from their use. While conflicts have arisen in the context of the small-scale irrigation program, the herders are more concerned with the proposed Tana Delta Irrigation Scheme that plans to irrigate c. 20,000 hectares of their prime dry season grazing. We have recently learned that foreign funding has been acquired for the project for an initial phase of 5,000 hectares.

Orma herders have approached the DDC and district officials on several occasions about the project, which as planned will jeopardize the livestock sector of parts of Tana River and Garissa Districts. It will do this by restricting access to the best grazing (the delta area) in the entire basin area. The delta is used by several thousand herders during the critical dry season period, and by a lesser number throughout the year. A realistic benefit/cost analysis conducted at district, regional, and national levels, would probably demonstrate that

the strengthening of existing livestock and farming systems of the area would have a greater benefit ratio than the proposed large-scale irrigation project. The disastrous experience upriver at Bura reinforces this point.

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