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# Aid Effectiveness to Infrastructure: A Comparative Study of East Asia and Sub-Saharan Africa

## Case Studies of Sub-Saharan Africa

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# Aid Effectiveness to Infrastructure: a Comparative Study of East Asia and Sub-saharan Africa

## Tanzania Case Study

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## Acronyms and Abbreviations

| | |
|---|---|
| AfDB | African Development Bank |
| ASDP | Agricultural Sector Development Programme |
| ASDS | Agricultural Sector Development Strategy |
| CHAWAMPU | Chama cha Wakulima wa Mpunga |
| COMESA | Common Market for Eastern and Southern Africa |
| FDI | Foreign Direct Investment |
| GBS | General Budget Support |
| GDP | Gross Domestic Product |
| GNP | Gross National Product |
| IDA | International Development Association |
| IMG | Independent monitoring mechanism |
| JAS | Joint Assistance Strategy |
| JICA | Japan International Cooperation Agency |
| KADC | Kilimanjaro Agricultural Development Centre |
| KATC | Kilimanjaro Agriculture Training Centre |
| KIDP | Kilimanjaro Region Integrated Development Plan |
| KRIP | Kapunga Rice Irrigation Project |
| LMADP | Lower Moshi Agriculture Development Project |
| LMIP | Lower Moshi Irrigation Project |
| MDGs | Millennium Development Goals |
| MDRI | Multilateral Debt Relief Initiative |
| NAFCO | National Agricultural and Food Corporation |
| NEPAD | New Partnership for Africa's Development |
| NSGRP | National Strategy for Growth and Reduction of Poverty |
| OECF | Overseas Economic Cooperation Fund of Japan |
| PFMRP | Public Financial Management Reform Program |
| PMS | Poverty Monitoring System |
| PPIAF | Public Private Infrastructure Advisory facility |
| PRBS | Poverty Reduction Budget Support |
| PRC | Peoples' Republic of China |
| PRSC | Poverty Reduction Support Credit |
| PSP | Private Sector Participation |
| PSRC | Parastatal Sector Reform Commission |
| PWC | Price Waterhouse Coopers |
| RAS | Regional Administrative Secretary |
| RDD | Regional Development Director |
| SADC | Southern Africa Development Community |

| | |
|---|---|
| SDIs | Spatial Development Initiatives |
| SSA | Sub-Sahara Africa |
| SUMATRA | Surface and Marine Transport Authority |
| TAS | Tanzania Assistance Strategy |
| TAZARA | Tanzania Zambia Railway Authority |
| UDI | Unilateral Declaration of Independence |
| ZPRP | Zanzibar Poverty Reduction Plan |

# 1. BACKGROUND

The development challenge facing Sub-Sahara Africa (SSA), Tanzania in particular, relates to the highest levels of poverty. A number of strategies have been put in place to address this challenge the main focus being how to sustainably enhance growth which is necessary for poverty reduction. Among constraints to growth are lack of supportive infrastructure and weak institutional capacity (including minimal state effectiveness and weak societal engagement). Studies show that growth is positively affected by the stock of infrastructure assets and that income inequality declines with higher infrastructure quantity and quality (Ndulu et al., 2007), but for most SSA countries, growth is constrained by lack of supportive infrastructure and weak institutional capacity, including minimal state effectiveness and weak societal engagement. Key institutions, both public and private, are necessary for private sector growth, which is an engine of growth. How institutions are harnessed and proper linkages between actors developed is a matter developing countries have been and are still grappling with.

It is against this background that a good amount of aid to Tanzania has been directed to infrastructure development. Infrastructural development is intended to provide a springboard and open up potential areas for growth, especially for the agricultural sector, a dominant sector in Tanzania. Aid management has other added benefits depending on how it is delivered, and most important is how involvement of locals, in partnership with aid providers, may have the potential of influencing the decision-making process, resource management, and institutional development in general. Institution building is thus critical in the process, and how aid delivery impacts on this is an important area for examination. We need to examine how aid can more effectively support economic development and poverty reduction is important to be further understood, in particular how aid can assist in the development of institutional capacity to sustain economic development.

This study undertakes to provide an analysis of aid project focusing on ways in which projects that have been implemented through aid money have contributed to transforming growth processes, beyond the economic impacts of planned physical outputs. The interest is on impacts related to ideas influencing policy, transfer of knowledge and lessons learned, organizational capacity to plan, implement and operate, and human resources development in general. Examination of the institutional linkages between aid projects and wider systems at the national level (policies, strategies, programmes) is thus the main focus of this study. Thus two hypotheses are addressed. First, sustainability of infrastructure services depends on

institutional spillover effects during project implementation fostering institutional and policy reforms, human resources development and capacity building. Second, donor policy and aid conditionalities matter for stimulating such institutional spillover effects.

## 2. SELECTION OF PROJECT CASES

To examine the potential role and impact of aid on institutional building in Tanzania two sectors are chosen, namely transport and agriculture. These are highly dependable sectors for sustenance of growth and development in the country. Tanzania set out a long term strategy in the development of transport beginning with the Second Five Year Development Plan (SFYP, 1969). The main objectives of which were centred on the achievement of a balanced development guided by the pattern of population distribution, marketed agricultural production and development of urban areas. Roads and railways are the central modes of transport that feature predominantly in the Plan. In this case Tanzania Zambia Railway Authority (TAZARA) has been selected. Unfortunately we could not find a suitable reference project due to TAZARA's uniqueness.

The agriculture sector is a dominant sector and backbone of the economy of Tanzania. Its share to Gross Domestic Product (GDP) averages 50 percent. Thus any discussion about growth and poverty reduction in Tanzania has to consider the agriculture sector, which according to the Household Budget Survey (2000/01), 80 percent of the poor live in rural areas and 81 percent of the poor live in households where the main economic activity of the head of the Household is agriculture. Furthermore 70 percent of the employed work in agriculture. Two projects, Lower Moshi Agriculture Development Project (LMADP) (main) and Kapunga Rice Irrigation Project (KRIP) (reference) have been selected.

### 2.1 Survey Objectives

The main objective of research is to assess the sustainability of the infrastructure services. Both, the state of the physical facilities and the quality of their management including financing and in-kind inputs from the targeted direct beneficiaries is important in order to have an idea of what should be done to have the services continued even after foreign aid has been reduced or completely cut off (e.g. willingness to take responsibility for operation and maintenance).

### 2.2 Main research questions

The following research questions guided the study:

- What are the requirements for qualitative improvement of institutional and physical sustainability of irrigation infrastructure and associated activities?
- Are there any changes in perception and attitudes of beneficiaries, including

farmers, towards the projects and what props up their willingness to be engaged in protecting the infrastructures from going to ruins (e.g., participation in operation and maintenance, any other improvements, etc).

- Institutional aspects including "governance" and "ownership" and the way they affect the working relationships amongst operators and farmers and farmers' associations and how these affect the sustainability of the irrigation facilities, and rail infrastructures.
- What other indirect project effects that affect the sustainability of the projects (e.g. health, education, environmental concerns),
- Government and donor policy related issues, if reinforcing one another and how they lead to institutions spillovers.

### 2.3 Description of methodology

The evaluation is essentially ex-post based on secondary sources of information including previous assessments augmented by limited primary, on-sight visit and interviews with key players. Though a set of questionnaires was designed at the planning level – for different stakeholders – regional/district authorities, project/scheme leadership, households and associations, during field work the questionnaires were not administered as such. Interviewees were engaged in discussions so they could narrate coherent stories around the projects, and take from them any policy related implications. Questionnaires were used as reference from which key questions relating to institutional/organizational set-up and sustainability were picked for discussion with the key players. These started basically at the regional level (where regional and then district authorities) recounted the importance of the projects/scheme activities in the regions' economic profile.

History and current status of each project was sought. A number of officials and beneficiaries, including farmers, were interviewed at the sights. As for irrigation projects interviews were carried out at farm blocks where they were continuing with harvesting and transplanting activities. On the fields it was possible also to talk to some of the women who were working on harvesting activities. A visit was made to the rice milling factory and a round trip to key sights enabled the research team to see the activities, including one considered to be undesirable, that of grazing cattle in the project area. As for TAZARA the regional leadership and engineers were interviewed, including a few beneficiaries who use the services and people who live along the environs/areas of influence of the infrastructure.

For each project, a brief background is provided which aims to show the national/sector policy context of the project, key players, project's cycle from design to

implementation and institutional setting within which sustainability of the infrastructure services can be discussed. The survey and review ultimately is concerned with making an assessment of sustainability of the infrastructure services. Institutional factors relating to polices, laws and organization that undermine or support delivery of sustainable services were observed on sight and through interviews.

## 3. AID EFFECTIVENESS AND CENTRALITY OF INFRASTRUCTURE IN DEVELOPMENT POLICY IN TANZANIA

"Aid is developmental only if it lays the foundation for its future rejection, i.e., if it can be used in a manner that promises eventual self-reliant and self-sustaining economy" (Mushi,1982:10). But after almost 4 decades of development assistance exit from aid dependence seems quite distant still for most developing countries. Though some countries in SSA have recorded improved average real GDP growth rates in the 1990s and other countries have graduated from International Development Association (IDA) borrowers to become "IDA donors" such as Botswana, Turkey and Chile, increased aid is still pushed at least in the "medium-term" in order to enable most recipient countries to create conditions for growth and a dynamic export sector. Delivery modalities constitute one of the determinants of effectiveness of aid, as are the recipients' development agenda and policies and institutional environment, about which there have been concerns relating to, for example, degree of ownership, capacity levels and governance.

Studies show that growth is positively affected by the stock of infrastructure assets and that income inequality declines with higher infrastructure quantity and quality (Ndulu et al., 2007).

### 3.1 Recent macroeconomic performance and aid flows

With almost 36% of the total population of 34 million living below the national basic needs poverty line, Tanzania still has a long way to achieve the Millennium Development Goals (MDGs) or Tanzania Development Vision 2025 growth targets pursued through National Strategy for Growth and Reduction of Poverty (NSGRP) (2005/06-2009/10) (URT, 2005), Zanzibar Poverty Reduction Plan (ZPRP)(2006-10), New Partnership for Africa's Development (NEPAD) and other regional and international arrangements. It is estimated that the economy has to grow by about 11% or more in order to attain the Vision 2025 targets but the weak infrastructure is one of the critical supply-constraints to that direction.

The economy is dependent on the agricultural sector which accounts for about 40% of GDP and 80% of labor force. Recently tourism and mining (gold, gems, etc.) sectors have become outstanding. Tanzania exports remain predominantly primary products (crops and minerals), the prices of which are volatile on world markets. Following reforms of the marketing and exporting of agricultural commodities more exports have been promoted, notably fish products, food grains, and horticulture. However,

domestic production is vulnerable to weather extremes and other supply constraints, including notably, weak basic infrastructure.

Economic growth took an upward trend beginning in the mid-1980s (figure 1). Prudent fiscal and monetary policies have led to macroeconomic stabilization and low inflation (Figure 2). In the past six years (2001 to 2006), GDP growth rate averaged 6% at constant 1992 prices. Inflation rate fell from 5.9 in 2000 to 4.4 in 2005 although provisional estimates for 2006 put it at 6.2% due to the impact of drought on agricultural production and energy. The energy crisis of late 2005 led to depressed industrial production and increased production costs across sectors.

Figure 1: Trends in real GDP growth

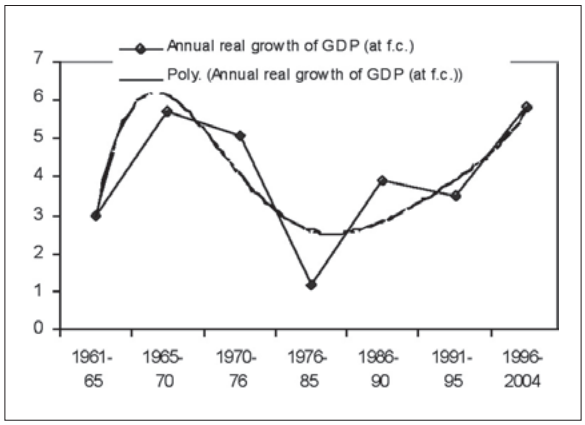
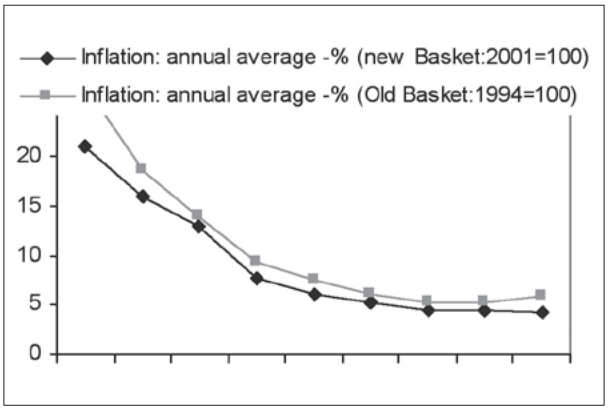



Figure 2: Trends in inflation rate




Source: Economic Surveys (various)

Government revenue has improved of recent but remains low with most of it from taxes on imports. The revenue effort (total collections as percentage of GDP) increased only slightly from 12.2% in 2001 to 13.3% in 2005 (was projected to reach 13.6% in 2006). This still falls short of the SSA average of 16%. Tax revenue is low partly due to dominance of small holding agriculture in Tanzania, which remains largely un-captured in the tax net. In addition, trade abounds in informal activities that are

difficult to tax. The widening fiscal deficit before grants in fiscal year 2005/06, the second year of implementation of the NSGRP, may be attributed to the felt-need to protect levels of spending on social service sectors at the same time setting aside more resources for promoting growth to sectors particularly infrastructure.

Aid continues to play a big role by complementing domestic resource gap (table 1). Grants as a percentage of GDP have risen from 4.5% at the beginning of the PRSP to 6.7% in 2005/06. Currently, aid finances over 40% of budgetary spending, up from some 20% a decade earlier (Mramba, 2005). According to the *Ministry of Finance General Budget Support Annual Review 2006* aid funds around 80% of the development budget. The ratio of central government debt stock to GDP has been dropping mainly due to (i) commitment in debt payments and (ii) the HIPC initiative-related debt cancellation and Multilateral Debt Relief Initiative (MDRI).

Table 1: Fiscal deficit and its financing (as % of GDP)

| | 1999/00 | 2000/01 | 2001/02 | 2002/03 | 2003/04 | 2004/05 | 2005/06 | 2006/07 Est. |
|---|---|---|---|---|---|---|---|---|
| Total revenue | 11.3 | 12.0 | 12.1 | 12.1 | 13.0 | 13.6 | 14.1 | 14.5 |
| Total expenditure | 18.6 | 17.0 | 17.6 | 19.8 | 22.0 | 25.0 | 26.3 | 28.3 |
| Overall balance before grants | -7.8 | -5.3 | -5.6 | -7.7 | -9.3 | -11.3 | -12.6 | -13.8 |
| Grants | 4.5 | 3.7 | 4.5 | 6.2 | 6.1 | 7.6 | 6.7 | 8.5 |
| Overall balance after grants | -3.3 | -1.6 | -1.1 | -1.5 | -3.2 | -3.7 | -5.6 | -5.3 |

Source: Tanzania Authorities Central Government Office & International Monetary Fund

Political stability, improved investment climate and commitment to reforms combined to trigger large inflows of official donor assistance and foreign direct investment (FDI). About 40% of FDI recently was directed to the mining sector, while the balance went into manufacturing, tourism and financial sectors. However, the government is aware of the fact that aid dependence has to be reduced. To do that aid as well as domestic resources should be used effectively to stimulate growth on a sustained basis. It is for this reason that aid effectiveness has become important in the development policy dialogue. And, as growth is constrained by the weak infrastructure base, public investment in infrastructure has been highlighted as a key area of policy interest for both donors and government.

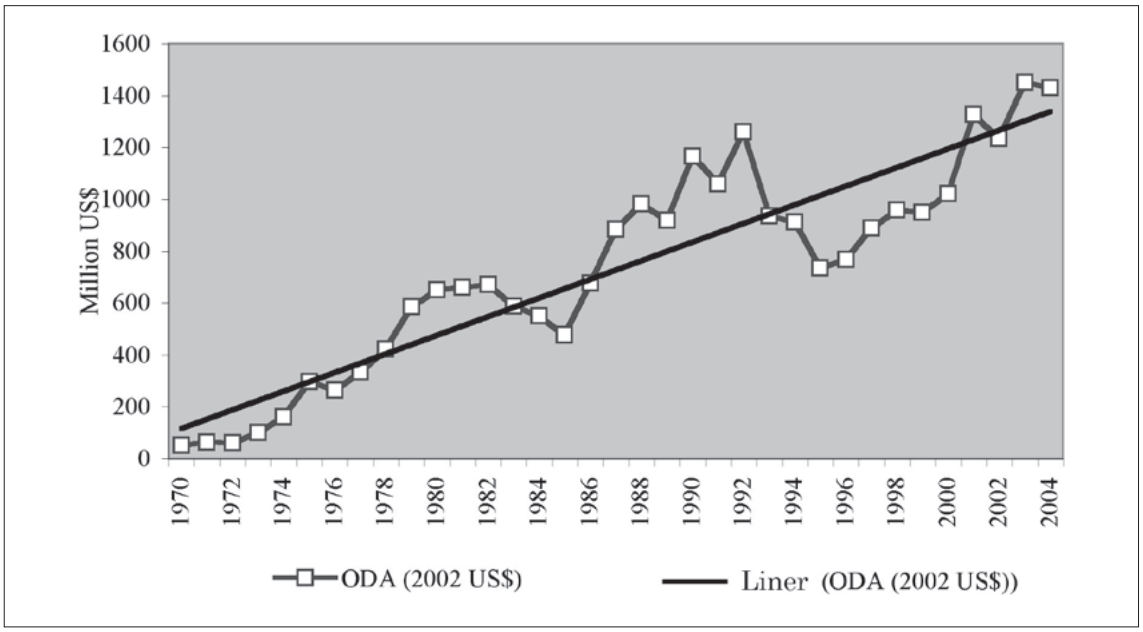
### 3.2 Aid to infrastructure and aid relationships

#### 3.2.1 Trends in aid

With a per capita income of about US$340 (2005 estimates) Tanzania is far below the US$885 IDA cut-off point for IDA eligibility and generally, the prospects for reduction in aid dependence are grim. Tanzania remains one of the largest receivers of aid in SSA with high levels of "aid intensity"[1].

Figure 3 shows the trends in aid inflows (ODA) in Tanzania since 1970 to 2004. The upward trend can be explained by the willingness of donors to support one of the poorest countries in the world and her adherence to or a failure to abide by performance benchmarks prescribed by or "negotiated" with donors (e.g. on necessary reforms and aid modalities).

Figure 3: Aid inflows trend in Tanzania




Tanzania's development policies towards *ujamaa* and self-reliance (through the 1970s) impressed quite a number of donors who willingly poured in aid to what was dearly regarded as "the human-centered" (socialist) development strategy. Performance succumbed to structural weaknesses and command-type policies that

[1] Aid intensity is defined as "the size of aid flows relative to the categories of economic activity they are designed to support, the categories including Gross National Product (GNP), population, imports, investment and government spending" (Wangwe, 2002).

stifled initiative and therefore obstructed aid effectiveness. Donors increasingly became convinced that aid to Tanzania could not be effective unless the country agreed to redress inappropriate domestic policies. This once again was in tune with positions within the donor community (countries and international financial institutions) that the state had to let most of economic activities to the market and focus on preventing market distortion. In response, Tanzania did, towards the mid-1980s begin to undertake market reforms. Since 1995 Tanzania began to undertake public finance management and institutional reforms as a condition for increased aid which had declined following concerns about malfeasance, that aid was not being put to good, intended use (Helleiner et al., 1995; Helleiner, 2000). The aid delivery modalities debate that followed to the present day emphasizes a need to channel aid to the priorities identified by the national development framework.

Aid relations improved following both parties agreeing and committing themselves to better partnership arrangements including independent monitoring mechanism (IMG) for holding all partners to account based on impartial and transparent assessments (IMG, 2001, 2002, 2005; OECD, 2003; Courtnage, 2004). Tanzania is party to the recent harmonization and alignment efforts initiated within the partnership approach between development partners and recipient countries.[2] Tanzania Assistance Strategy (TAS) (later Joint Assistance Strategy (JAS))(URT, 2006b) represented the first move towards harmonization of procedures to channel aid in accordance with the national priorities identified in the poverty reduction strategies which in turn demand increased investment in infrastructure.

### Aid to infrastructure

The NSGRP emphasis on growth envisions scaling up public investment-led fiscal policy – to enhance fiscal space for infrastructure on the understanding that public investment in physical and human capital 'crowds-in' (rather than crowd out) private investment since such infrastructure creates facilitative environment for private sector operations. Such infrastructure is critical for the delivery of the social services and the whole gamut of the MDGs.

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[2] International initiatives under the Rome and Paris declarations, they aim to increase the effectiveness of aid on the ground (URT, 2005; Wohlgemuth, 2006). More concrete initiatives include the 2003 "*Rome Declaration on Harmonization"* which addresses concerns about aid delivery and monitoring and good practices or principles, the need to recognize the limited capacity of recipient countries and to fit donor practices with recipient national development priorities and systems. The High Level Forum held in 2005 called "*Paris Declaration on Aid Effectiveness"* commits its signatories to take action to strengthen ownership, alignment, harmonization, results and mutual accountability. A workshop in 2006 on the "*Paris Declaration on Aid Effectiveness: Implications and Implementation"* sought, among other issues, to identify practical actions to implement *harmonization*, *alignment* and *managing for results*.

A good amount of aid to Tanzania has been directed to infrastructure development in the hope that infrastructural development provides a springboard for growth. The developmental outcomes of aid depend on how aid is delivered, and how involvement of local beneficiaries influences the decision-making process, resource management and institutional development in general.

A preoccupation with aid effectiveness to infrastructure is justified by the simple fact that infrastructure (under discussion in this study) in transport, water and sanitation, power, telecommunications and irrigation covers and serves vast majority of struggling poor populations and economy - easier access to markets and social service provision points, information, less reliance on rain-fed agriculture, etc. Infrastructure and services thereof help overcome geographical distances among settlements and markets and enhance the scope of internal and external trade, allowing exploitation of economies of scale.

The benefits of infrastructure investments can be multiple, including direct and indirect impacts, welfare benefits of time and costs saved through improved access, direct employment benefits during infrastructure development and long-term operation and maintenance. There are also benefits associated with the transfer of technology and technical capacity building for operation and maintenance where these are included in the design and pursued after the installation of the project so as to ensure sustainability of the services. Important therefore is the assessment of institutional arrangements for raising the absorptive and implementation capacity and impacts in terms of human resource development of the beneficiaries.

### 3.3 Japan's Assistance to Tanzania and its Priority Areas

Japan has considered Tanzania as an important target for its official development assistance based on the country's political stability and its effort towards growth and reduction of poverty. Table 3 shows Japan's assistance though General Budget Support (GBS) since 2001/02.

Prioritized sectors for Japan's Country Assistance Program for Tanzania, as elaborated in June 2000, included promotion of agriculture and small-scale industries, basic education, basic health and medical services, basic infrastructure and forest conservation. Along with support of the NSGRP thrust, Japan supports Aid Harmonization and Coordination effort along with other donors budget support, financing basket funds, etc. assistance has been extended to the Poverty Reduction Budget Support (PRBS), debt relief and Poverty Monitoring System Pooled Fund under the scheme of non-project grant aid, co-financing with the World Bank to

the Poverty Reduction Support Credit (PRSC), support to the Public Financial Management Reform Program (PFMRP) and the Poverty Monitoring System (PMS), among the main ones.

Table 3: Japan's GBS/PRBS to Tanzania as of January 2007

| Financial Year | JPY million | USD million | Scheme |
|---|---|---|---|
| 2001/2002 | 530 | 4.2 | Grant aid for debt relief (*) (50% of total) |
| 2002/2003 | 480 | 4.0 | |
| 2003/2004 | 46.3 | 0.4 | |
| 2004/2005 | 500 | 4.5 | Non-project grant aid for structural adjustment support (**) |
| 2005/2006 | 545 | 5.1 | |
| 2006/2007 | 545 | 4.7 | |
| | 2,000 | 1.7 | Loan aid (PRSC Co-financing) (***) |

Notes: * Grant aid for debt relief from 2001/2002 to 2003/2004 was provided for the Government of Tanzania in return for repayment of its ODA debts. 50% of total the grant aid was utilized as general budget support in those years. However, the Government of Japan changed its debt relief method from Financial Year 2003 and decided to forgive debts of eligible debtor countries by canceling relevant ODA debts owed to Japan Bank for International Cooperation (JBIC) instead of providing Grant Aid for Debt Relief.
** Non-project grant aid for structural adjustment support: is designed to financially support to import commodities. However, this aid has been exceptionally utilized as budget support only in Tanzania.
*** Loan aid (PRSC Co-financing): is the loan assistance to the Government of Tanzania as co-financing to the PRSC of the World Bank under the Minimal Interest Rate Initiative (MIRAI: which means "future" in Japanese) with the annual interest rate is 0.01% and the repayment period will be forty years including a 10-year grace period
Source: The Embassy of Japan in Tanzania

In agriculture, for instance, aid aims to improve productivity and reduced reliance on rain-fed production. Japan provided technical support for irrigated rice production through the Kilimanjaro Agriculture Training Centre (KATC) and, in addition, capacity development for irrigation-related technology at the level of local government. Japan has contributed to the development of the Agricultural Sector Development Strategy (ASDS) and its implementing program, Agricultural Sector Development Programme (ASDP) and to support to the ASDP Basket Fund established in 2006.[3]

For basic infrastructure, Japan has supported paved trunk roads, electrification network and telephone circuits in Dar es Salaam, power transmission and distribution, among others. With pavement ratio of trunk roads at merely 5%,

[3] The other sectors supported in terms of infrastructure include basic education (e.g. school construction); Population, HIV/AIDS and Children's Health (support to national hospitals, control of infectious diseases, strengthening of health management capacity, medical centers and referral systems and dissemination of knowledge and information on sanitation to local people).

transport infrastructure is critically deficient. In this sense, Japanese aid puts emphasis on operation and maintenance of invested infrastructure with the ownership of the central and local governments are also crucial. Development of human resources in technology is a big challenge in this area. One key observation is, for instance, the importance Japan has placed on capacity building for road works project management and capacity strengthening of labor-based technology training. This, as a matter of principle, ought to be asked of the many infrastructure projects and exactly what lessons can be learned from the past projects.

## 4. PROJECT CASE A: TANZANIA ZAMBIA RAILWAY AUTHORITY (TAZARA)

TAZARA was established under a Tanzania-Zambia Government Agreement in 1968, which was incorporated into Acts passed by the Parliaments of the two countries. The two Governments had earlier accepted in 1967 an offer made by the Peoples' Republic of China (PRC) to construct the railway line. The Chinese offer was in the form of a turnkey project with the Chinese undertaking all construction works, and being responsible for all supplies and for providing training for the staff of the Authority. The project was financed by an interest-free loan of RMB Yuan 980 million (approximately US$ 500 million). The construction works commenced in October 1970. Track laying work from Dar-Es-Salaam (Tanzania) to New Kapiri Mposhi (Zambia) was completed in 1975, covering a distance of 1860 kilometers, with 975 kilometers in Tanzania, and 885 kilometers in Zambia. TAZARA provides a gateway to Southern, Central, and East Africa business market covering both Southern Africa Development Community (SADC) and Common Market for Eastern and Southern Africa (COMESA) regions. Its construction was planned for opening up the country's south regions and for the exploitation of the mineral resources there, apart from providing Zambia with an outlet. TAZARA was thus built to provide a strategic route to the sea for Zambia and for political reasons to foster an alliance between decolonized African states and the PRC and to undermine the power of apartheid and colonial governments upon whose railways Zambia had been dependent for sea-access.

### 4.1 Current situation of the project

TAZARA came into full public service on 1st July 1976 and the railway was handed over to the two Governments of Tanzania and Zambia by the Chinese Government on 14th July 1976. The railway is now almost 27 years old. TAZARA is wholly and jointly owned by the Governments of Tanzania and Zambia on a 50:50 basis. The railway primarily transports metals and agricultural produce. The major metal traffic comprises of copper exported by Zambia through the Port of Dar-Es-Salaam. A total of ninety-three (93) railway stations were constructed on TAZARA. However, in order to rationalize commercial operations, only forty-nine (49) stations are currently active with the rest closed down. Out of 49 stations, 28 are in Tanzania Region and 21 in Zambia Region. The railway has a design capacity of carrying 5 million tones of freight per annum, i.e. 2.5 million tones in each direction. TAZARA has indeed been a major economic conduit in the region. However, it has never been profitable. TAZARA has never performed to everybody's expectations. This raised a lot of concern from shareholders and other major stakeholders.

In April 2004, Public Private Infrastructure Advisory facility (PPIAF) an institution of the World Bank commissioned Price Waterhouse Coopers (PWC) to undertake the options study to identify the most appropriate mode of Private Sector Participation (PSP) in TAZARA. Alongside the above process the Government of China formally invited the two Governments of Tanzania and Zambia for a special Tripartite meeting in Beijing to discuss the way forward for TAZARA including the proposed PSP Process. In October, 2007 a decision was reached by the TAZARA Council of Ministers to Concession TAZARA with the Chinese getting the first preference.

### 4.2 Hypothesis I: sustainability and institutional spillover effects

#### 4.2.1 Mapping the Institutional Mechanism/Organization involved

TAZARA was constructed as a single-track line, with a general interior-to-coast port alignment, during the early 1970's. There have been minimal additions in a form of sidings to Commercial Centres, e.g., the Oil storage facilities in Dar es Salaam area, the Southern Paper Mills, the Mbeya Cement plant in Mbeya etc. The line is jointly owned by the Governments of Tanzania and Zambia and is operated as a public institution namely Tanzania Zambia Railway Authority. Most of the operations/ Maintenance/Renewal funding are done in-house through TAZARA's own generated revenues. A significant part of the renewal programmes are funded through the technical cooperation between the Governments of Tanzania and Zambia on one hand the Government of China on the other. Recently, minimal assistance has been channeled to TAZARA through budgetary allocations by the Government of Tanzania and Zambia.

TAZARA is operated and managed under the following structure. There is a *Council of Ministers* constituted by 6 ministers, 3 from each country drawn from the Ministry of Infrastructure Development, Ministry of Finance and Ministry of Trade and Industry. The Chairmanship is on rotational basis by ministers of Infrastructure Development of the respective countries on 1 yearly basis. There is a *Board of Directors,* which has a similar format as that of the Council of Ministers with 3 members from each country. Members include two permanent Secretaries from the respective Ministries of Infrastructure Development, Ministry of communication and Transport, and the rest with experience in the areas of finance, industries and Transport. The *Management* team is responsible for day to day running and managing TAZARA operations. The team consists of the Managing Directors (Chief Executive officer of the Authority), Deputy Managing Director, two Regional General Managers for Zambia and Tanzania and 4 Directories responsible for functional operations of the Authority. With the above set-up-all business operations, management and conflicts

are discussed and resolved.

### 4.2.2 Key players, decisions reached

The idea to connect Central and Southern African States with the Eastern Coast of Africa through a rail link started as far back as 1964. Both the Tanganyika and Northern Rhodesia had for a long time wished to develop their vast areas agriculture-wise in the south West of Tanganyika and North East of Northern Rhodesia. On the Tanganyika side, plans for this had been discussed for many years while on Northern Rhodesian side the suggestion was beginning to receive prominence and support through the advocacy of Kenneth Kaunda (former president of Zambia). Earlier, the colonial masters had undertaken a number of surveys into the project and nearly all had declared that the proposed line was economically unjustifiable. This was at the time of nationalist agitation and it was apparent that these conclusions had political implications in that such a rail link would affect their interests in the region.

The Unilateral Declaration of Independence (UDI) by Ian Smith regime tried to intimidate Zambia out of her support for the liberation struggle by cutting her only outlet to the sea. The leaders of Tanzania and Zambia who were aware of Zambia's dependence on the southern route and its implications visualized that the Northern East Rail Link was the only way for the country to maintain the economic and political independence and hence initiated the construction of TAZARA, the UHURU (meaning independence) Railway as it became known for its contribution to the liberation of Southern Africa. Western countries were first approached for assistance to build the line, but rejected on the understanding that the project was economically not viable. This view, which was equally supported by the Word Bank, meant that assistance from that quarter was not possible.

The PRC then under the leadership of Chairman Mao Tse Tung (Ze Dong) was approached and readily accepted. The Chinese leadership saw the wider necessity of the line and thus offered to finance and builds it. Hence on 5$^{th}$ September 1967, an Agreement for the construction of TAZARA was concluded in Beijing, China between the three Governments of China, Tanzania and Zambia.

The TAZARA was established in March 1968 and the survey and design work was promptly commenced in October 1968. This was completed in May 1970. By now it had been decided that the line should start from Dar es Salaam and end at Kapiri Mposhi. In July 1970, China agreed to give Tanzania and Zambia an interest free loan which was to mature after thirty years totaling Yen 988 million (about US$ 500 million at the time) to cover costs of constructing the line and supporting

infrastructure of Stations and the supply of motive power and rolling stock. Construction of the line started in October 1970 and Presidents Julius Nyerere of Tanzania and Kenneth Kaunda of Zambia officially inaugurated the commencement at Kapiri Mposhi in Zambia and Dar es Salaam in Tanzania, respectively.

The project was financed by an interest-free loan of RMB 988 million (approx USD 500 Million) to be paid in 30 years after a grace period of 10 years. The construction works commenced in October 1970. Track laying works from Dar es Salaam (Tanzania) to New Kapiri Mposhi (Zambia) was completed in 1975, covering a distance of 1860 Km, with 975 Km in Tanzania and 885 Km in Zambia. The TAZARA Project came into full public service on 1st July 1976 (after one year of trial operations) and was handed over to the two Governments of Tanzania and Zambia by the Chinese Government on 14th July 1976. The railway is now 31 years old and is wholly and jointly owned by the Government of Tanzania and Zambia on a 50:50 basis.

### 4.2.3 Effectiveness of the Institutional Mechanism

Issues of efficiency, accountability and adaptability are among the key elements expected of a project of this magnitude. Unfortunately TAZARA, like any other sub Saharan public run railway, has never performed to that expectation. This raised a lot of concern from shareholders and other major stakeholders. In April 2004, PPIAF an institution of the World Bank commissioned PWC to undertake the options study to identify the most appropriate mode of PSP in TAZARA. Alongside the above process the Government of China formally invited the two Government of Tanzania and Zambia for a special Tripartite meeting in Beijing to discuss the way forward for TAZARA including the proposed PSP Process. Coupled to that, the Chinese Government sent a team of experts in two groups to undertake a study to evaluate the situation on the ground for TAZARA so that they could make an informed decision whether to participate or not in the PSP in TAZARA.

Both reports, i.e., the PWC and the Chinese were submitted to TAZARA and received by the two Governments through a joint Tanzania and Zambia Task Force for further guidance and action. In October, 2007 a decision was reached by the TAZARA Council of Ministers to Concession TAZARA with the Chinese getting the first preference. In November, 2007 the TAZARA Council of Minister traveled to china to conclude the discussions on the way forward and future outlook for TAZARA.

The TAZARA project as a railway investment ought to be based on defined financial criteria mainly carried out by purely commercially based business operation principles. For many years of TAZARA operations and indeed from the inception of it

this has not been the case until 1995 when commercialization of the organization took effect. Before that TAZARA's operations were mostly politically influenced in line with political struggles of the South African states.

As such TAZARA is now in financial crisis and the emphasis should be on evolutionary improvements to fix existing services. Future investments should be focused on mitigation measures on existing operational and financial constraints. Definite criteria needs to be set for TAZARA operations to be evaluated by its ability to meet contractual agreements by the shareholders through agreed set performance indicators that would be determined by the financial returns achieved by Management/Board of Directors. Contrary to that the project is doomed to further decline in performance and subsequent collapse.

The main emphasis under this paradigm should be on maximizing the contribution of TAZARA to the economic growth and achievement of social objectives. This could be by way of a combination of private sector for commercially viable operations/ investments and public sector investments for network improvements to stimulate economic growth and accommodate increased traffic volumes. Under this vision TAZARA, could make a greater contribution to economic and social development but would require a considerable degree of financial support, the magnitude of which would depend upon the willingness and ability of the two contracting states, i.e., Tanzania and Zambia to finance the required improvements.

### 4.2.4 Institutional spillovers

One of the challenges countries face as far as investments in infrastructure are concerned is ensuring sustainability of the services offered by such investments. It is hypothesized that sustainability of such services depends to a large measure on institutional spillover effects during project implementation fostering institutional and policy reform, human resources development, and capacity building. Examination of this is done by looking at, among others, how new technology has spread to other projects, stimulation of local private Sector (e.g. construction), sustainable development of institutional capacity, skilled people moving elsewhere, impacts of donor policy and practice, and impacts on government policy and regulation. There are, indeed, factors that are critical to ensuring sustainability of services provided by an investment.

As a part of technology transfer process from China into Tanzania and Zambia the project has produced a sizeable breed of very well trained experts from all facets of disciplines who in most cases have proved to be very marketable in other

organizations as well. To cite a few examples, the current Government Inspector of Railways (Surface and Marine Transport Authority: SUMATRA), the former Registrar of the Engineers Registration Board and two former presidents of the Institution of Engineers Tanzania are TAZARA's former employees who underwent professional trainings within systems TAZARA as well as worked for TAZARA prior to joining current institutions. It has also been observed that the design, construction and operation process of the TAZARA project has influenced and injected a very strong working culture both from the local society and within the local experts, i.e., engineers, technicians and other operational officers.

Another important area is the springing up of the private sector, and how they have grown because of their association with TAZARA operations. Local manufacturing companies are providing spare parts and materials for maintenance and repair works of TAZARA equipment and infrastructure. Workshops expansion and modification has been made to allow for changed maintenance and repair technology due to changed equipment/locomotive technology. Construction of rail sidings to plants built along the line, e.g., Mbeya Cement Company, Malawi Cargo Centre, Mufindi Paper Mills, Oil installation facilities, etc. All these installations were designed and built by local construction companies.

On the economic front, over the years the TAZARA project has been in operation, significant achievements have been made in the way of development along the corridor it traverses. The discussion here is confined to Tanzania as not much can be said about the Zambian side.

The most interesting spillover is the number of towns in the Southern region lying along TAZARA line that have experienced rapid growth. These include Mbeya, Makambako, Mlimba, to mention a few. At Mbeya, a newly crowned City, a new Airport is being constructed at Songwe. Once this Airport is completed, Mbeya is envisaged to be the hub of trade and commerce in the region including Tanzania, Zambia and Malawi of which TAZARA stands to be a major carrier of the transacted traffic. In Makambako, timber production has increased significantly. TAZARA has around 50,000 tones readily available on the ground every month. Meanwhile Mlimba Township has now been electrified and has been connected to the national grid, after the completion of the Kihansi Hydro-electric power station in the area.

The Kihansi power project was one of the major strategic project undertaken by the Tanzania Government and whose construction was facilitated by TAZARA though transportation by rail of the construction materials and heavy equipments and machinery. Mlimba is now attracting business and is geared for further expansion.

Other developments which have taken place on the Tanzania side of the line are the establishment of the Mbeya Cement Plant and the Southern Paper Mills (currently Mufindi Paper Mills). Cement from Mbeya, especially after privatization of the company is now one of the major traffic moved by TAZARA. Similarly paper products and in puts for Mufindi Paper Mills are moved by TAZARA.

The communications coverage has expanded significantly in Tanzania. Private television and telephone companies have extended their services into the regions along the TAZARA line. Mobile Cellular Phone service providers such as Vodacom, Celtel and Tigo are now also providing services, which cover towns along the line up to Tunduma (Tanzanian border with Zambia). There is now utilization of the TAZARA track for communication through optic fiber communication systems by communication companies.

Tourism offers one of the most promising opportunities for investment particularly in South of Tanzania, where the Mikumi National Park and the Selous/Game Reserve are located. The TAZARA line passes through the Selous Game Reserve, which is the largest Game Reserve in East and Central Africa, and provides interesting game viewing. Currently a privately owned Tourist Train "The Rovos Train" operates from Cape Town (South Africa) through Zimbabwe and Zambia up to Dar es Salaam Via TAZARA once a year. Another train "The Fox" shuttles periodically between Dar es Salaam to Selous Game Reserve. Several enquiries have been received from other private Operators who are interested in running similar tourist trains. The TAZARA line is used by tourist companies operating their trains on TAZARA infrastructure on "a road model" approach, i.e., one railway line being used by several operators.

TAZARA was built through rather uninhabited area. Later there has been industrial development alongside the line, hydroelectric power plant at Kidatu and a paper mill. With the existence of TAZARA, opportunities for mineral prospecting do exist to investors. For example the Mchuchuma coal field in Mtwara is only 290km from the TAZARA line. The titaniferroues magnetite care deposits in Liganga area are located South of Njombe in Iringa are only 100km from TAZARA line. Investment along the TAZARA line would therefore also be justified by the existence of the several mineral deposits in the surrounding areas. The impact of the above listed activities have resulted into job creation in particular and increased economic activities in general which culminate into economic growth to individuals and society along the line hence poverty reduction.

TAZARA line forms the artery of TAZARA corridor, which includes the economic potential of the Dar es Salaam hinterland plus the rich agricultural plateaus of the

Southern Region of Tanzania (part of Morogoro, Iringa, Mbeya, Songea & Rukwa). Through the Tanzania and Makambako – Songea highways, the TAZARA line is also linked to the Mtwara Development Corridors thus connecting Tanzania with Malawi, Zambia and Mozambique.

The SADC of which Tanzania is a member, is promoting regional development projects in the form of "Development Corridors". In a strip along a linear transport infrastructure, a major road or railway line like TAZARA, the development corridor encompasses all types of economic development projects, which could be serviced by the transport route. The corridor where the TAZARA line traverses is one of the several corridors identified by SADC as potential investment corridor projects which are under the so-called Spatial Development Initiatives (SDIs). Projects under these initiatives are aimed at poverty reduction and job creation through industrial and agri-eco-tourism development. This is well in line with the National Strategy for Growth and Reduction of Poverty (NSGRP/MKUKUTA). SDIs are a particularly significant vehicle for public-private partnerships, focusing on areas with untapped economic potential, they could facilitate regional integration by promoting investments, employment and wealth creation as well as infrastructure development.

Through the National Transport Sector Investment Programme and the East African community sub-Sectoral Programes, two new line links have been proposed for feasibility study to link TAZARA i.e the Lind – Mchuchuma – Liganga, Makambako and the Tunduma – Sumbawanga – Kigoma railway lines. The objective of these new proposed railway links is to explore and haul the mineral potential from the area and also to provide infrastructure connectivity from Mtwara and Dar es Salaam Corridor with the Great Lakes Region respectively.

### 4.3 Hypothesis II: the role of the aid relationship

As pointed out in section 3, the delivery modalities constitute one of the determinants of effectiveness of aid, as are the recipients' development agenda and policies and institutional environment, about which there have been concerns relating to, for example, the degree of ownership, capacity levels and governance. Donor policy and aid modalities matter for stimulating institutional spillovers. Examining this requires an institutional approach to the study of aid influences, by looking at the drivers of aid effectiveness. Ownership, capacity development, and influence on government policy are key issues.

The Chinese offer had policy conditionality in that it was in the form of a *turnkey project,* i.e., a project that one of the parties agrees to supply at a contract price,

a complete product/project ready for use such as a new factory, ship, transport, infrastructure/rail, etc. TAZARA was thus financed and executed by the Chinese. The Chinese undertook all construction works, and were responsible for all supplies and for providing training for the staff of the Authority. The Chinese approach had, therefore, limited impact in promoting local ownership.

The aid relationship had, however, an influence on capacity development. As a long term corporate sustainability strategy to develop and maintain railway skills, a Railway Training Centre was built at Mpika in Zambia. The school provides pre- and in-service training to staff in various railway disciplines and other related fields. There is provision for intensive and modern training programmes to TAZARA employees both within and overseas. There has also been an expansion of TAZARA Training School thus enabling it to handle other training programmes and courses for outsiders instead of focusing only on in-house programmes for TAZARA use. Equipment rehabilitation and procurement programmes are in place to improve on rolling stock capacity and efficiency, e.g., the on going rehabilitation works of Locomotives at Mbeya Workshops to be completed in 3 years (TAZARA, 2007). There is also a commitment of major customers e.g. the Mines, Wet Cargo/Oil companies and others to have permanent railway links and facilities with TAZARA.

To ensure that technology and know-how got transferred to locals, during the construction of TAZARA a workforce of more than 150,000 Tanzanians, Zambians and Chinese were engaged. This involved 65,000 Tanzanians, 35,000 Zambians and 50,000 Chinese experts. Parallel to that, over two hundred (200) engineers, technicians and operational staff underwent training in China and locally in order to take over operations and management of the railway. Over 6,000 Tanzanians and Zambian nationals were later employed on permanent basis when the project started commercial operations in July 1976 to work with their fellow Chinese experts (TAZARA, 2007).

# 5. PROJECT CASE B: LOWER MOSHI AGRICULTURE DEVELOPMENT PROJECT (LMADP)

## 5.1 The current state of affairs

The LMADP is an intervention financed through Japanese loan aid to the tune of JPY3300 million (US$633 million). There was also technical support provided through Japan International Cooperation Agency (JICA). The Lower Moshi Irrigation Project (LMIP) was formulated by Japanese experts, through JICA on a preliminary basis and later incorporated into the Kilimanjaro Region Integrated Development Plan (KIDP) in 1977 as part of the Third 5-year Plan (1976-1980) of the Government of Tanzania. The chronology of events to the operational stage was as follows:

- JICA sent a Japanese planning team to the Kilimanjaro region in 1974 following a series of sectoral studies (agriculture, industry, tourism, infrastructure, etc.) already done beginning 1971.
- Intensive field survey from December 1976 to January 1977 (technical support by JICA).
- Establishment of Kilimanjaro Agricultural Development Centre (KADC) through the Japanese grant aid in 1978 with JICA technical support, which was in operation until 1986. KADC dealt mainly with experimental pilot farms and agricultural training. KADC buildings were built through capital grant aid.
- Discussion on implementation schedule of LMIP between Regional Development Director (RDD) and Japanese Preliminary experts team, April 1979.
- Feasibility study carried out December 1979 to March 1980 (technical support by JICA, Nippon Koei Co., as consultants).
- Construction of the irrigation facilities (LMADP 1984-1987) through yen loan provided by Overseas Economic Cooperation Fund of Japan (OECF) (the present JBIC)
- Start of production activities in August 1985, KADC providing intensive guidance and supervision, switching to Kilimanjaro Agricultural Development Project (KADP), the successor of KADC, from March 1986 to 1993, following a shift a more large scale production-oriented project. KADC concentrated in three main areas: research, human resources development, and technological dissemination.
- Official handing over of LMIP to the government of Tanzania March 1993
- Establishment and operationalisation of Kilimanjaro Agricultural Training Centre (KATC), 1994-2002, (with technical support by JICA) to disseminate the experiences of rice production in Kilimanjaro and throughout Tanzania.

The LMIP focuses on irrigation, drainage and flood control, all with the main

objective to modernise paddy farming. The project was implemented on account of the prominence of agriculture in the country and in Kilimanjaro region in particular. Agriculture employs about 90% of the population in Kilimanjaro. There is however scarcity of land forcing people to resort to intensive cultivation. Irrigation was therefore considered important and although traditionally practised it covered only 14% of cultivated area (4,500 ha). There was also a problem of understaffing of field extension officers, insufficient facilities, primitive structures, and problematic water rights. It was therefore intended to stabilise agricultural production, increase acreage and reduce population pressure on land. The project components included: nine irrigation schemes covering 6,320 ha, 19.3 flood protection dikes and 28.2 km of flood ways, 24.8 km improvement of farm road network, drilling of 20 tube wells, and procurement and installation of a pumping station.

It emerged, however, that as the project firmed up more people were attracted to it, i.e. irrigated farming activities expanded and settlement around the villages in the irrigation area expanded with more allied activities being established. Villages in the neighborhood copied irrigation techniques and particularly of concern were those in the upstream area which tampered with the water that was meant for the project. These put stress on the capacity of the project/scheme; but also equally important has been the management of the conflicting land uses even within the project, between farming and livestock keeping.

The primary purpose of the project/scheme has been to support increased agricultural production of rice through irrigation. Rice cultivation in the project covers 1,100hactares out of 2,300hactares in four villages – Mabogini, Rau ya Kati, Chekereni and Oria. 1,200hactares are set aside for upland crops including maize, sunflower and sorghum. As a result of the project there has been a net increase in net farm income, increased profitability, increased income earning opportunities, including off-farm income, with over 1000 jobs created within the project boundary and over 5,000 jobs in the whole area.

The scheme has two *water sources*: Rau River and Njoro River with two intakes: Mabogini Intake and the second on Rau River. The design of the project is such that excess water from Mabogini Intake will flow into Rau Intake. About 90 percent of the irrigation water during the dry season (September-March) is obtained from Njoro River while for Rau this is only 10 percent due to excessive abstraction upstream and outside the project.

Major infrastructures of the scheme include two intakes:

(i) Mabogini Intakes weir for Upper and Lower Mabogini areas

(ii) Rau Intake weir for Rau ya Kati, Chekereni and Oria

Both intakes have a fixed concrete weir, a scouring gravity type founded of hard compacted gravel layers 2-3m below ground surface. The design discharge for Mabogini intake weir structure is 1,280m3/sec., while for Rau the discharge is 1,802m3/sec. The irrigation network is sub-divided into *two systems:*

(i) Mabogini system for Mabogini area

(ii) Rau System for Rau ya Kati, Chekereni and Oria areas.

Each Irrigation canal from the head works comprises the main, secondary and tertiary canals. To minimize seepage losses, the main, secondary and 10% of the supply canals or water course are lined up with pre-cast concrete blocks. To maintain flexible operation of the canal systems, different unit design discharges are applied to respective canals. Several canal structures are provided: e.g. the turn-outs, culverts, drops, spillways, aqueduct water measuring flumes and weirs to ease canal water conveyance and distribution.

A road network with truck, main, secondary and tertiary as well as field roads forms another integral part of the scheme. There is also a flood dike along the river so as to protect the scheme from seasonal floods from Rau and Njoro rivers.

Farmers were organized in units known as tertiary blocks, which were further sub-divided into several irrigation units. Water distribution was done through a rotational method, with the aim to meet peak water requirements. The control of water from the intake up to the turnouts of tertiary canals was under the project office. The control of water within the tertiary blocks was under the respective farmers, while the activities of farmers were organized and coordinated by Water Users Assembly. There was also established in every village in the project of Village Water Users Associations.

### 5.2 Hypothesis I: sustainability and institutional spillover effects

#### 5.2.1 Mapping the Institutional Mechanism/Organization involved

The physical infrastructure for LMIP was constructed through a loan from OECF/ JBIC and guidelines for operations and management provided through the technical support of JICA. The overall management of LMIP was in the hands of KADP. Critical issues for uninterrupted irrigation services depended further on the extent to which finances would be available not only for operation and maintenance but also for rehabilitation in case of need. To the extent that materials needed to repair or renovate the physical structures and supervision, inspection and security of the structures cost money, issues of the sources and use of such resources turned out to be

critical basis for assessing the sustainability of the infrastructure. It did emerge from the discussions also that credibility of project leadership and that of the associations before the beneficiaries encouraged the beneficiaries to contribute to efficient operations of the project/scheme.

Of particular importance is institution building premised on civic organizations and increased management capacity. Management of farmers cooperative is the key to sustainability. One relates to the basic institutional arrangement set up to ensure efficient water management. This included:

(i) A rice farmers association, CHAWAMPU, (Chama cha Wakulima wa Mpunga) which has been a critical player in the process, including involvement in meetings that made decisions on the choice of sources of seeds, selection of nursery sites, and raising of seedlings within the LMIP.

(ii) Water Masters and gate keepers run by CHAWAMPU are assigned each irrigation system to provide prompt and proper management at the main, secondary and tertiary gates basing on actual demand and the rate of river run-off

(iii) Daily field patrol to inspect the work of gate keepers, block leaders and farmers in order to promote irrigation technique at the farm level

(iv) Monthly meetings between CHAWAMPU and KADP (project/scheme administration, Water management section) to discuss various implementation related issues, including the official start of the cultivating season

(v) Radio Communication System has/was introduced to promote close cooperation amongst staff of CHAWAMPU and project/scheme. However, currently staffs depend on mobile phones.

(vi) Notice boards have been installed at main points to communicate with farmers on irrigation and other working schedules

In the beginning, in 1985, the project/scheme used to get budgetary support from the central government, through RDD, and Japanese government through its support to Tanzania. Since 1993 support from these two sources was reduced drastically. CHAWAMPU have been paying most of the costs of operation and maintenance. Currently, each farmer is supposed to pay TShs 55,500/= (US$50) per plot per season and TShs 3,000/= (US$3) as membership fee and TShs 5,000/= (US$5) for share-holding in the society. Farmers have, among other things, *experienced significant increases in paddy yields,* from the average of about 2.0 tons/hectare before the arrival of the project to the average of 6.5 tons/hectare, which accounts for the *commitment of the* farmers to the project/scheme and to their society and adherence to most of the regulations (although as it was found out, there were a few problems which required

attention of higher authorities).

It was clear, however, from the farmers' point of view that the irrigation service fee was not a problem as such as long as the irrigation services were delivered as required and according to obvious conditions (e.g. when rain was scanty and the reduced volume of water was distributed fairly). Rather problems arose when there was suspected favor for one area at the expense of other areas. This did not appear to be so much the case. There were no complaints of this nature except perhaps at the higher level dealing with administration and management of project/scheme assets.

Another issue relates to the administration of the scheme. At the start administration was mainly by Government, first central government under RDD then, now under local government structure, thus under the District Executive Director in the Prime Minister's Office-Regional Administration and Local Government.

When in 1993 central government withdrew, CHAWAMPU took charge of day-to-day activities, collecting money to run the irrigation services; KADP, the overall overseer of LMIP, would handle technical matters. In 2002 a commission's assessment of problems at the time led to the formation of the transition committee in 2003 to run the project. The Transition Committee was under local government and would operate up to 2004. The committee instructed CHAWAMPU to hand over project properties including tractors, tillers and other implement etc. In 2005 the project was placed under KADP taking charge of the properties. Misunderstanding persisted with CHAWAMPU still claiming ownership of the properties.

Presently, LMIP is directly under the local government authority. CHAWAMPU still has grievances over the properties; but continues to manage issues of marketing of paddy and other crops (upland crops). The report notes with concern the existence of tensions within the administration as one of the factors that would prevent smooth delivery of the infrastructure services on a sustained manner. The scheme management, CHAWAMPU and local government need to work in harmony while constraints internal to respective entities must be addressed accordingly; such problems are discussed.

### 5.2.2 Key Actors and decisions

The project is an outcome of the request for development assistance by the Government of Tanzania to the Japanese Government as early as 1970. In April 1979, the implementation schedule of the LMADP was discussed between the RDD and the Japanese Preliminary Survey Mission. RDD expressed its strong desire to advance

the general time schedule of the Project and to commence the actual construction work not later than the end of June 1981. Mapping of the Project area was undertaken by JICA. In November 1979 JICA invited Nippon Koei Co. Ltd to submit proposals to undertake the feasibility study. JICA appointed a Supervisory Team for the feasibility study to arrange the "Scope of Work" for the study with RDD and supervise the Consultants' study on its behalf. One notes here the visible presence of the Tanzania Government through the process, a good indication of ownership. But also, there was a strong presence of the Japanese government and Japanese experts and agencies to ensure continued support to the project implementation.

### 5.2.3 Assessment of sustainability of services created by project

#### Technical back-up of the project/scheme

The primary factor for sustainability of the irrigation services (once the irrigation infrastructure was laid down), is the availability of technical know-how to carry out the regular operations and maintenance. LMIP project unit is staffed with trained experts in farm management, irrigation engineers/technicians and water resources management experts as part of a team of project/scheme management. These form the backbone of the technical backup of LMIP and provide expert inspection of the infrastructure and extension services, as part of the technical support provided by JICA.

During project planning and possibly during construction, strategic plans had to be made as to how operation and maintenance would be carried out. Being donor-funded the project would one day be turned over to local beneficiaries for operations (local experts) and financing of these operations (Tanzania government and local people themselves).

(i) Japanese long-term and short-term experts were assigned to KADC for seven and half years. Tanzanian counterparts were trained in Japan and machinery and equipment was provided to the centre. From 1986 to 1900, for instance, 292 extension officers, 242 farmers, and 247 tractor and agricultural machinery operators and supervisors were trained, bringing the number of trainees to 781.

(ii) Project management and technical experts (with consulting expatriates on station) were capable enough to run the expert-level day-to-day activities including passing down knowledge hands-on to farmers. Proof of this is continued operations but also, perhaps more significantly, the fact that the knowledge was later copied to, and by farmers in adjacent areas (that are not in the project but tap water from the sources that the project depends on). During this survey, a large number of farmers, particularly those living

downstream, voiced concerns related to water shortages during the dry season.

(iii) The contributions of the farmers to the operation and maintenance by way of paying the irrigation service fees and related charges especially after the donor and the central government had stopped or reduced budgetary support is another factor that explains the potential for sustainability of the infrastructure project. Willingness of majority of farmers to pay fees indicates continued commitment to the scheme other management problems notwithstanding.

(iv) Proper use, transparency in the use of the resources – financial structure of the organizations considering levels of irrigation service fees, the role of management personnel, and basic organizational functions such as data management methodology and accounting.

### Management and organization Project Implementation

For the management of LMIP an executing office was established and was known as the Project Office under the jurisdiction of the RDD. To properly coordinate, guide and assist the Project Office was the Executive Committee made up of Regional Planning Officer, Regional Accountant, Regional Irrigation Officer, Regional Agricultural Development Officer, District Development Director, Village chiefs, to name a few. KADC was responsible for coordinating and assisting the Project Office in operation and maintenance. At farmers' level, irrigation associations were to be organized in each scheme to operate and maintain the on-farm facilities with assistance from the Project Office. Thus the regional administration was fully represented.

One of the critical aspects in the mechanization of the scheme was utilization of tractors. Tractor hiring services in LMIP began in 1985/86. This involved the RDD received a loan by the Government of Japan for KADP. The Tractor Hiring Services was set up to properly manage the tractors and implements. The Tractor Hiring Service section collected tractor hiring charges from Water Users Association. The hiring rates were set by the Government of Tanzania and were below the market rate thus could not cover fixed and operational costs. The central government provided KADP with recurrent and development funds to meet operational costs. Thus during the initial project-type cooperation period all the costs were met by both the governments of Japan and Tanzania, with farmers paying little for the services.

This arrangement ended in 1993. The project-type cooperation between the two governments came to an end and the government of Tanzania stopped financing the project. Farmers had therefore to start meeting all the costs of tractor hire and other facilities of the LMIP. This was the time when CHAWAMPU was formed and

registered with mandate to determine the cultivate charges per plot and oversee other necessary operational obligations for smooth running of LMIP. Revenues collected were to be used by the members. KADP were charged with the responsibility to train CHAWAMPU staff.

The end of the Japanese support and the withdrawal of the Tanzanian government ensued a new era. Friction arose in the running of the scheme; friction over who should own and run the LMIP facilities and other properties. The main and clearest source of conflicts relate to the shortage of water in the project area (irrigated 2,300ha), giving rise to conflicts over water distribution. There have also been administrative sloppiness which has caused mismanagement of basic farming equipment, and there has been failure to implement regular repairs of tractors and other facilities. There were problems also with the irrigation canals, which could not be rehabilitated as required. Paddy productivity went down. Management relationships between the regional leadership under the Regional Administrative Secretary (RAS), KADP and CHAWAMPU needed to be redressed, with proposals that the Moshi District Council should replace the RAS's office; whose interference affected farmers' interests, with negative implications on ownership.

### Scarcity of water, growing and competing uses

Pasua and Mandaka communities copied irrigation technology, seen as a spillover effect. But this diverts water meant for the LMIP area. These communities also claim water use rights, are closest/first to the sources of project waters and it is thus difficult politically to deny them access; and the land tenure system is such that it is not possible or even desirable to remove them from their traditional area.

According to project design, estimated water requirement was 1,280l/s; but right granted by the Pangani River Basis Authority is only 804l/s. For the Rau System, design flow was 1,802l/s, but right granted is 1,135l/s. Besides, there is tampering by downstream users.

Rationing has to be implemented along with enforcement of by-laws and tightening of field patrols to prevent misuse of water along the canals.

### Livestock grazing

Within the scheme livestock are kept by farmers. Efforts by authorities to control them using existing by-laws continue but bounce on the fact most of the flocks belong to the same farmers making use of LMIP facilities, and a few from neighboring villages. Enforcement then becomes difficult, yet another evidence that not all farmers have taken seriously the instructions and lessons about best agricultural practices.

This is another possible threat to the project/scheme which nevertheless should not be laid to the entire farming community but to a few farmers who are a threat to the irrigation services and physical infrastructure. Animal trekking leads to soil erosion, thus distorting (slope) levels and hard pan, as well as raising unit water requirement (caused by a number of factors including non-zero-grazing). It was noted the unit water requirement had risen from 1.33l/s/ha to 3.0l/s/ha.

### Marketing issues

After the LMIP became operational the number of rice traders in Moshi increased and price fluctuation of milled rice has been moderate. Indeed the price range of paddy in the LMIP, Mandaka Mnono and the NADP has been low compared to that which obtained in other areas in the country, say Kyela district and Mwanza. Thus the rice double cropping practiced in LMIP, Mandaka Mkono and NADP had stabilized the farm gate paddy prices.

Currently it was pointed out the biggest business was associated with paddy and rice marketing. A total of 8-10 private paddy hulling mills and the modern Kilimanjaro Tractor Hiring Company are doing the post-harvest processing. A cadre of middlemen had grown but farmers were facing "unfair" treatment during buying/ selling of paddy and rice. The farmers were cheated on the weights of paddy or rice by having to fill sacks, popularly known as "*lumbesa*" which carried more than the rightful and fair weight of 100kgs.[4] The country's Weights and Measures Authority (WMA) has yet to extend it arm in the area to enforce the law. Early solution to Weights and Measures problems will release energies and attention of smallholders to pursue quality improvement investments for higher unit values and earn goodwill and reputation of their produce in the international market.

The other problem related to the imported rice that tended to compete with the variety grown in the area. This raises the question as to what government should do to assist on this. In the meantime the project/scheme had developed a new variety – semi-aromatic type (SARO5) in order to attract domestic consumers away from the imported varieties.

Further, there was unconfirmed news that rice from the project/scheme was being smuggled into neighboring country/countries. It was important therefore for policy

[4] *Lumbesa* is a famous oversized bag which is commonly used by traders to pack agricultural produce from farmers. It carries about 150 kgs; but the farmers are forced to take a payment for 100kgs.

to ensure that even with a liberalized regime, the farm-gate price is favorable to the farmer – that is – to ensure that the farmers are fairly paid. Therefore more than supporting the farmers through (say) subsidies and employees to the scheme (paid for by local government), the government has to assist the producers' associations (in this case CHAWAMPU) in designing marketing strategies that ensure a higher return (price) to the farmer and control illegal exporting. Illegal exporting would not thrive if farmers got an attractive price from the buyers (especially private buyers).

As for economic and technological influence, close to 20 years of Japanese co-operation to Kilimanjaro region in the agricultural sector have resulted in remarkable adaptation of improved farming technologies by, and improvement of the living standard of, rice farmers in Lower Moshi and surrounding areas. The technologies were acquired through two co-operation projects namely, the KADC and later KADP which operated in the LMIP. The KATC project was established to disseminate the improved technologies to farmers in other rice growing areas in Tanzania. KATC became therefore a national project catering for the whole country. KATC programmes were designed to teach farmers and agricultural officers in extension, irrigation and mechanization from various rice growing regions in the country.

It is also important to note some of the impact on the social side of issues. There has certainly been social change in the labour force and entrepreneurship. Notable are generation of wage labour for women, female middle persons did emerge giving them new employment opportunities; purchasing paddy from the field, carrying it to a milling centre, drying, milling, and selling the milled rice to buyers from other areas. New entrepreneurs have also emerged, with rice farmers investing in shops dealing with daily necessities and food; farmers becoming entrepreneurs. There has as well been improvement in the quality of life as farmers began to access basic needs and afforded school fees for their children. Another positive development is the empowerment of women, in that they have become income-earners, thus raising their social status.

### 5.3 Hypothesis II: the role of the aid relationship

A number of ideal issues that Japanese donor policy seeks to amplify may be invoked, including relevance of support to the country and direct beneficiaries (farmers in this case), effectiveness in turning around the lives of the recipients and sustainability of the project/scheme or program on which aid is directed to.

As mentioned earlier the LMIP was formulated by Japanese experts, through JICA and later incorporated into the KIDP as part of the Third 5-year Plan (1976-1980)

of the Government of Tanzania. This is a clear testimony of the beneficiary country effective involvement, crucial for ownership of the initiative. Also notable is the long-term presence (15 years) of the Japanese support and potential link this particular intervention was to have on government agricultural development policy. LMIP is one of the largest agricultural technical cooperation efforts and combined the use of several development instruments to reach the desired goals. *The unique aid relationship relates to the combination of technical cooperation, Japanese yen loans, and capital grant aid.* There was also a yen loan provided for the Rural Electrification Project to cover the establishment of an electric transmission line from Moshi town to the KADC project site to guarantee power supply to the area.

The development of LMIP indisputably influenced the expansion of rice cultivation areas in its surroundings and neighbouring regions. The expansion in Kilimanjaro region was from 250ha to more than 1,000ha. Other regions which have benefited from this project, an experiment of its kind, were Tanga in Lushoto and Korogwe districts, Coast region in Bagamoyo district (JICA supported Bagamoyo Irrigation Development Project) and Mbeya region (Kapunga Rice Project).

What stands out also in this aid relationship is seen in three main areas. One the concentration of resources, which totaled US$48.6 million covering loan, capital grant aid and technical cooperation. This resource concentration assured farmers household income, food supply and creation of jobs to increase. Two, inter-linkages between the various schemes within the project: irrigation and supply of tractors, technical know-how, rice mills, power supply, etc. Three, accumulation of human/productive capacities in that KADP was able to train 292 extension officers, 242 farmers, and 247 operators and supervisors of tractors and other agricultural machinery.

Tanzania later in 2002 formulated ASDP borrowing a lot from lessons obtained from this intervention. ASDP is now being implemented at the district level through District Agricultural Development Strategies and programmes. All the above ideals may be tied around the promotion of local ownership, a concept used to depict the essence of getting direct beneficiaries (in this case farmers in the target scheme area) involved in project planning – right from the identification of the needs – needs assessment – and justification, the gains they stand to make (justification and relevance), identifying potential threats and therefore their role throughout the project life.

Another issue relates to how technology transfer was to take place. The small scale rice farmers in the LMIP and its surrounding areas had shown an example of productivity and profitability of rice cultivation. There was thus a need to spread

the achievements to farmers in other rice farming areas. In 1992 the government of Tanzania forwarded a request to the government of Japan for further cooperation, which led to the establishment of the KATC; again a demonstration of recipient government initiative, important for enhancing ownership and suatainability. This was aimed at addressing capacity building needs with a view to develop a centre of excellence for the diffusion of irrigation farming techniques in the scheme area and beyond. The centre now caters for neighboring countries while both the training centre and scheme provide research resources for higher learning institutions (colleges and universities) in the country. The objective was to disseminate the improved technologies, operated nationally covering the entire country, to farmers in other rice growing areas in Tanzania. Training was to cover extension personnel, farmers, and other concerned people in the whole country in the aspect of irrigated rice.

The Japanese aid policy has also insisted, basing on experience elsewhere, on using the farmers' cooperatives and other forms of producer associations/water users' groups, as well as in identifying and integrating relevant activities that spring out up around or as a result of the project (participatory approach). Inevitably these activities or effect can be project enhancing or project- or welfare-undermining. Advance knowledge of these makes it possible for the project key players to get prepared to support the project-enhancing ones and to prepare to take corrective measures against the negative impacts.

Emphasis has also been made of continued technical support, including research at higher levels (specialized lines in agronomy, mechanization etc) with a steady line of communication to the farmers whose knowledge should, over time be enhanced in terms of less-sophisticated operations and maintenance (even if under supervision) though extension services (capacity development of farmers). Transparent and accountable management of fees (irrigation groups in the new setting and CHAWAMPU to oversee this) were practiced so as not to demoralize the farmers.

A downside to this aid relationship relates to how LMIP was officially handed over to the government of Tanzania, which was done in 1993. The project was handed over before proper arrangements were made, particularly in organizing farmers to smoothly take over the project. This meant that future prospects would be uncertain. A few issues stand out in this regard:

- Although the central government had directed the Kilimanjaro region authorities to hand over the project to CHAWAMPU, the society did not seem to be ready for that. CHAWAMPU put forward a request to the government to postpone the hand over until when it was more organized for the take over.
- The central government had stopped releasing funds for the running of the

project. CHAWAMPU was then supposed to collect and control the necessary budget for operation and maintenance. Whether the society had the necessary muscle to handle that is uncertain.

- There was some dragging in establishing an “After care project” by the Japanese government under conditions that the Tanzanian government could ensure fair and strict control of irrigation water inside and outside the LMIP, and fully collect land preparation fees, water charges, entry fees and membership share contributions.
- The sustainability of the project did not depend on irrigation water management alone. Tractor servicing is also important. It would have been expected that CHAWAMPU should have formulated a long term and firm plan regarding sustainability of all machinery.

# 6. PROJECT CASE B -REFERENCE: KAPUNGA RICE IRRIGATION PROJECT (KRIP)

## 6.1 The Current Situation of the Project

KRIP is located in Mbarali District in Mbeya region, 40 km from Mbeya City. It was established in 1989 and funded by African Development Bank (AfDB) , Kajima a Japanese firm was the main contractor of infrastructures. KRIP (1988-92) had three main objectives: (a) to establish a National Agricultural and Food Corporation (NAFCO) parastatal rice farm; NAFCO becoming an executing agency, (b) to build smallholder irrigation scheme, and (c) to improve abstraction from 4 intakes from the Chimala river. The expected benefits from KRIP included production of enough food to citizens surrounding the place in particular and to all Tanzanians in general, provision of agricultural services like technical education and water services, and minimization of external dependence and importation of food from outside the country.

The project comprised of two systems, the large capital intensive mechanized farm and a smallholders' scheme. The government through the state parastatal, NAFCO, owned the large farm (3000 hectors), while Kapunga smallholders, as individual farmers, owned about 800 hectors. There were also smallholders around Chimala area holding 1,500 ha. The developed infrastructures included irrigation infrastructures (i.e. canals, pumping machines), staff office blocks, houses, school, dispensary, workers canteen, guest houses, rice mill, complex workshops, warehouses, water supply, electricity, fuel storage, access roads and tracks etc. There was also a rice mill complex with 6 mt/hr of paddy, 4mt/hr operating capacity; 8 storage silos for paddy (10,000mt).

Farmers in Mbarali district use both traditional and modern irrigation systems for crop production. District technicians continue to provide technical support to the farmers to improve traditional irrigation system skills and the use of modern irrigation system. Both systems were involved in order to get water. There are more schemes constructed now in that area. Local government continues to provide technical support to the NAFCO-Mbarali project and smallholders around the project. They provide advisory services (production techniques), diseases and paste control, especially outbreak of diseases and destructive animals i.e. animals and birds which can not be managed by the project and farmers. But the scale of such support is lower compared to the KRIP era, i.e., when NAFCO was present.

The production trend for paddy was good in the initial years of the project, at about 4 tones per ha of land during 1990 to 1995. Production dropped in later years,

recording 2.5 tones per ha from 1996 to 2005, dropping further to 1.5tonnes per ha by 2005/06. NAFCO farm was closed down in 2001 when NAFCO was wound up. A care taker committee set up by Parastatal Sector Reform Commission (PSRC) rents out land to individuals on a seasonal basis. The infrastructures were shut down except for the irrigation canals, which are used by individual farmers on rental fee basis. The government decided to privatize the scheme and is now owned by a private company known as EXPORT TRADING COMPANY. The new operating company is in the initial preparation of cultivating 6ha only.

The increased rice production in the Kapunga area from 1990 to 2006 brought large increase in the incomes of farmers as price rose. Rice yields in the smallholders' farm reached the peak of 30 bags at highest harvest and 10 bags at lowest harvest per hector of land. As compared to traditional methods, the yields were about 5-6 bags per hectors of land. Farmers treated rice as a cash crop and hence limiting the amount used for personal consumption. Stability of farmers' incomes is now in jeopardy due to lack of assured technical support services, uncertainty of water supply and thus falling productivity.

But the smallholder farmers are operating at a reduced level currently due to technical problems and lack of effective support services. Before the closure of NAFCO, farmers were directly benefiting from KRIP through use of different services such as hiring inputs at lower cost, receiving technical services to irrigation related activities, water control and provisional at right time and servicing of canals using excavator machines. All these services ended and became unreliable with the closure of NAFCO. The poor performance of KRIP has also led to the change of support policy as the government is no longer able to provide such support; leaving farmers at the mercy of the investor.

In summary the current status is that:

- The success of KRIP stems from the fact that it incorporated the participation of smallholders and ensured gender balance. Thus, while consistent with government policy of large state farming, it recognized the importance and needs of the local people.
- Compared to the large, capital intensive mechanized NAFCO farm, smallholders showed resilience in that they consistently achieved higher yields and used irrigation water more efficiently and they are still in operation todate, though at a reduced scale.
- The NAFCO farm (3,000 ha) was closed down in 2001 when NAFCO was wound up. A caretaker committee set up by PSRC rents out land to individuals on a seasonal basis, there is thus a surge of smallholders; their average yield stands at

2.9 metric tones per ha.

- Another area relates to efficiency in water utilization. Smallholders' efficiency stands at 65% compared to NAFCO's 45%; the norm being 75% in the Usangu Plains.
- The infrastructure is shut down except irrigation canals which are used by individual farmers on rental fee basis.
- The smallholders components are operating but on a reduced level because they lack technical support from the government in terms of extension services, etc., problems and lack of effective services.
- There is reduced yield from 4.3 metric tones (1990/91) to the present 2.5 metric tones per ha.
- Government has privatized the large scale component with no clear policy on how smallholders are to be supported.
- A study rates the performance of the irrigation project as unsatisfactory on the sustainability benchmark (AfDB, 2006); contributed much by the large, capital intensive ex-NAFCO farm which has been closed and thus no longer generating any meaningful production streams.
- Smallholders have a good chance of being sustainable but they lack adequate technical support. Meetings with smallholders identified the following issues as pertinent in ensuring sustainability, namely lack of technical support and poor management, availability and the right of access to water and use by farmers at right time, reliability of the market and prices of paddy, and availability of the irrigation facilities and their servicing. All these were assured when NAFCO was in operation but have since become problematic once privatization was carried out.

### 6.2 Mapping the institutional mechanisms/organisations

As was the case for LMADP ,the assessment is done based on operation and maintenance over time rather than cost-benefit analysis. Sustainability implies that physical facilities and expected services do function considerably the period after the construction phase. One of the important aspects of this intervention was its contribution to institutional development. In 1991, NAFCO was able to hire equipments like 5-trectors, 1-combine harvester, 1-catapilar, 2-motorbikes and other farm instruments. Most of these machines were not available in 2003. Farmers had to obtain these facilities from private businessmen at higher costs.

EXPORT TRADING COMPANY does not provide such services to farmers. Two fields (Chimala and Dibira) are hired to individual farmers and the company itself cultivates 6 hectors only. The company failed to supply servicing machines to

farmers who are now forced to use traditional methods to construct water canals. The failure to supply electricity and breakage of tapes for drinking water also shows the unsuitability of the project.

In the absence of NAFCO which was originally mandated to manage the investments, the USHIRIKA WA UMWAGILIAJI KAPUNGA (Kapunga Irrigation Association) was formed, as an initiative of small-scale farmers, and was registered in August 2007. Members are farmers around Kapunga area; they are about 760, of whom 52 come from outside the area. Entrance fee is Tshs. 5000 (US$5) and each member should have five shares at the minimum. Each share is equivalent to Tshs. 10,000 (US$10).

The main objectives of the Association include:

- To provide water services to the smallholders,
- Access of credit facility to farmers,
- Utilization of the productive area, and
- Financial stability/equity so that they can assist their members/farmers.

The Association allows smallholders get access to water, as they collectively bargain and pay water fee to the export trading company (private company) of Tshs. 1,300,000 (US$1300) per season. Then private company pays that money to LUBADA Water Management authority. Also the association links farmers and other associations operating in that area with Savings and Credit Co-operatives Societies (SACCOS).

Another is the KAPUNGA SMALLHOLDERS Association, which was formed in 1992 and has a total of 769 members. The objectives of the association are:

- Improve living standard and poverty alleviation in the society,
- Selling their crops (rice) collectively, and
- Ensuring reliability of marketing their crops.

*Activities of the association*

- Rice irrigation services to the members.
- Collecting and selling rice collectively.
- Searching and establishment of the market.
- To develop saving credits (SACCOS) and to build relationship to other institutions.

*General performance of the association*

(i) Changing from traditional to modern agricultural practice.
(ii) Initiations of new means of crop storage (crop receipt) at Chimala town.
(iii) Improvements of living standard of members to access social services such as education and health.

(iv) Some farmers bought some agricultural equipment such as power tiller for agricultural activities.

(v) From 2000 to 2006, the cultivated land has been increasing over time, and hence the rise of production, i.e. the period of 2000/1 was at 64.5 percent and 2006/7 rose to 98.9 percent.

*Challenges facing the association*

- No proper market place for their crops.
- The inputs and agricultural equipment do not reach them at right time.
- Inputs are too expensive.
- Some infrastructures are poor, i.e. roads, canals, (no machines like excavator, grader and caterpillar) as used to be the case before.
- There is a small land area but many farmers.
- Water right and accessibility of storage area (go-down).

There are also storage facilities for new investor facilities in Kapunga area which are not operating properly. So the storage facilities are located in Chimala town. Smallholder farmers from Kapunga and Mbarali use these facilities. Only 10% are coming from Mbarali area while the rest come from Kapunga area. The lager go-down was hired to Botanic Cargo Superintendence Company since 2005. The period of 2005/6 farmers stored 500 tons. The next period (2006/07) stored 3340 tons. There were about 601 members (farmers) but only 251 members deposited their crops. The period of 2007/08 produced 1500 tons only. At that time the company faced some shortfalls in receiving crop storage due to the following reasons; (a) privatization of NAFCO-Kapunga to new investor, (b) deterioration and mismanagement of infrastructures, i.e. water control and services of canals, and (c) price fall of the crop.

The company is operating under the SACCO, i.e. savings and credits cooperative, proncilpes. Farmers (members) are required to pay a rent of 2% for the amount she/he borrowed. Also he/she is supposed to pay storage charges and if he/she wants to carry the bags he/she must pay Tshs 700/= for each.

Benefits for a farmer to be a member

- Price stability – the member will be paid their money regardless the price prevailing in the market.
- Farmers will borrow money at low interest rate.
- Stability of income through cashing on receipts.

### 6.3 The institutional spillovers

Since the operation of KRIP there have been some experienced changes around the

project.

・ *Irrigation technology spread to the other farmers*

In Chimala area, there are many schemes engaging in paddy farming activities. These includes, Igumbilo Isitu, Njombe, Chosi, Herman, Matebete, Mgonakororagogolo, etc. all schemes were using new irrigation techniques in plantation and harvesting, market searching and selling jointly, and social assistantship obligations e.g. to assist parents who could not afford to pay their children school fees.

Knowledge of irrigation mechanism was transferred very quickly to the smallholders in Mbarali district. When Kapunga was under NAFCO, there were great efforts to conduct training which had direct contact with farmers in Chimala. Technicians used different methodologies such as farmer field school, adoption plots, exchange visits, agricultural shows, group discussion, demonstration plots and audiovisual aids. These methods helped farmers in Chimala area to adopt new techniques for paddy cultivation.

・ S*timulation of local private sectors and attraction of skilled people to the area*

Some of the popular businesses include; smallholder shops selling some basic items, sewing machines, small-scale milling and transport services from Kapunga via Chimala to Mbeya town. Telecommunication services are also available in that area. Mobile cellular phones companies such as Celtel, Vodacom, Tigo are providing the services.

・ *New forms of revenue generation*

The pooling together of produce with a common storage facility has enabled farmers and their associations to control revenue collection and stabilize income flows to members. Small holders have organized themselves into a cooperative to safeguard their interests.

### 6.4 How LMADP and KRIP compare

We put in the table below how the two irrigation projects compare

| **LMADP** | **KRIP** |
|---|---|
| 1. Long presence of the Japanese guaranteed provision of technical support | 1. Executing agency was NAFCO a government parastatal, which closed thus denying smallholders of assurance for technical support |
| 2. Focus was on smallholders | 2. Mixed presence of large, capital intensive NAFCO farm with smallholders |
| 3. Elaborate arrangements for operations and maintenance, run by the rice growers cooperative society, CHAWAMPU | 3. No institutional development for operation and maintenance, smallholders not quite organized to take over |
| 4. Clear local ownership orientation, important for sustainability despite management frictions | 4. Though not quite vivid, but smallholder resilience an important issue for entrenched ownership and sustainability |
| 5. Clear system for water use, with charges managed by CHAWAMPU | 5. Smallholders are at the mercy of the private operator who now runs the NAFCO farm |
| 6. High participation of locals in decisions | 6. Smallholders given opportunity to participate |
| 7. Japanese support came as a package (aid, loan, technical support), with inter-linkages between components: irrigation, water, know how, power, etc | 7. No such package, AfDB support to Government of Tanzania through NAFCO focused on technical support which never survived for along time. |

## 7. FINDINGS AND RECOMMENDATIONS

The study has examined two hypotheses using three projects. There was no reference project for TAZARA due to its uniqueness. There are lessons that we can draw from them. We see some marked differences based on the approach followed. There are cases were ownership was assured through in-depth involvement by the Government and local beneficiaries, with long-term presence by the financier (LMADP) while this was not the case with TAZARA for instance, a *turn-key* project. Assurance of technical support, transfer of technology, capacity building initiatives, and institutional developments that ensures and backs up operations have been identified as critical for sustainability of service delivery. We provide below issues that we consider worthy taking note of, as lessons from the study:

- Training, skills development and technology transfer to locals, and the possibility of migration of employees and technology to other interventions and economy at large are among the factors being mentioned as key to sustainability. Much vivid in then case of LMADP.

- Training (capacity building) opportunities if availed provide an environment for lasting presence of the technology so transferred. TAZARA through the Railway Training Centre built at Mpika in Zambia; LMADP through KATC. Kapunga's reliance on NAFCO, a parastatal, failed to tick.

- Ownership in terms of local involvement in decision making through the process is critical. The Chinese offer was in the form of a *turnkey project* with the Chinese undertaking all construction works, and being responsible for all supplies and for providing training for the staff of the Authority. Hence there was need for the Chinese, TAZARA being such a big project worth USD 500.00 million by then, to have stayed behind/or at least enter into some kind of joint venture with the two contracting states of Tanzania and Zambia in the operation and Management of it. This approach could have enabled sustainability of TAZARA in terms of technology diffusion, more effective change in working culture and perhaps early establishment of other productive ventures of which products TAZARA could have been a potential carrier. Thus the Chinese approach had limited impact in promoting local ownership and ensuring sustainability of the services. LMADP, with clear mandates by RDD, local government authorities, farmers, etc., assured that this would be there. Resilience of smallholders in the case of KRIP has elements potential for sustainability.

- TAZARA's major contribution has been in promoting possibilities for regional cooperation through regional/collaborative development projects, in the form of "Development Corridors", a popular approach now in the sub region.

- It did emerge from the discussions also that credibility of project leadership and that of the associations before the beneficiaries encouraged the beneficiaries to contribute to efficient operations of the project/scheme. The cases of Lower Moshi and Kapunga testify to this. The report notes with concern that the existence of tensions in LMADP within the administration involving scheme management, CHAWAMPU and regional administration, as one of the factors that would prevent smooth delivery of the infrastructure services on a sustained momentum.

- There was a strong and longer presence of the Japanese government and Japanese agencies to ensure continued support to the project implementation. This has turned out to be one of the primary factors for sustainability of the irrigation services (once the irrigation infrastructure was laid down), an assurance of availability of technical know-how to carry out the regular operations and maintenance. Establishment of KATC ensured that this support would continue to exist.

- Focusing on smallholders appears to pay off and creates ground for scaling up and sustaining the gains. As earlier noted, compared to the large, capital intensive mechanized NAFCO farm, smallholders showed resilience in that they consistently achieved higher yields and used irrigation water more efficiently.

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