

# **RICE SUB-SECTOR STUDY**

**DEVELOPMENT  
ALTERNATIVES INC**

**PRIVATE ENTERPRISE  
SUPPORT ACTIVITIES  
PROJECT  
TANZANIA**

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## ACRONYMS

/=	Tanzanian shillings
AMC	Agricultural Marketing Co-operative
ASMP	Agricultural Sector Management Programme
DAI	Development Alternatives, Inc
DRC	Democratic Republic of the Congo
ECI	Ebony Consulting International
FIDHUSCO	Fida Hussein and Co. Ltd.
Fob	Free on Board
MCM	Ministry of Cooperatives and Marketing
MAFS	Ministry of Agriculture and Food Security
METL	Mohammed Enterprises Tanzania, Ltd
MSE	Micro and small enterprise
NAFCO	National Agricultural and Food Corporation
NMB	National Microfinance Bank
NMC	National Milling Corporation
PESA	Private Enterprise Support Activities
SACCO	Savings and Credit Cooperatives
SGR	Strategic Grain Reserve
TOSCA	Tanzanian Official Seed Certification Agency
TFA	Tanzania Farmers' Association
USAID	United States Agency for International Development

## **EXECUTIVE SUMMARY**

Rice is a very important sub-sector in Tanzania. Rice is the second most important food crop, after maize, and most of the rice consumed is produced within the country. However, as Tanzania imports between 50,000 and 100,000 tons of rice per annum, international rice prices play an important role in setting prices locally. Despite this, the local price for rice usually doubles over the course of the year, largely due to pressures on farmers related to cash flow.

### **OVERVIEW**

Rice is a particularly important crop in the PESA regions, where it involves at least 281,000 rice growing households. These in turn hire substantial amounts of labour to work in the fields, employ people to move the rice, sell to local traders who store the rice and then subcontract with small mills to mill the rice. The rice is then usually sold to traders who have to have bags filled and loaded onto trucks before transporting the rice to large urban areas, primarily Dar es Salaam, which is the principal market in the country. In Dar, an intricate network of brokers, wholesalers, touts, middlemen, and retailers ensure that the product gets to the end consumer. Overall, there are up to 35 cash transactions involved in this entire process, making rice an extremely good crop for stimulating economic activity.

The PESA regions include some of the most productive rice growing areas (Mbeya and Morogoro) and the areas with the highest quality and most sought after rice (Kyela and Mbarali) in the country. Since rice production is usually heavily concentrated into certain geographic clusters with high potential, it provides a good opportunity for the project to focus its activities.

### **SUB-SECTOR DYNAMICS**

Though most rice is consumed primarily on the farms in the rural areas, in absolute terms, the main commercial forces driving the sub-sector relate to the urban markets, with Dar being the most important. The team identified four major channels by which rice moves to the main markets in the urban areas: the traditional farmer/trader (channel one), the small irrigated rice farmer/trader (channel two), the integrated miller/trader (channel three), and the integrated farmer/miller/trader (channel four):

- Channel one includes the greatest number of actors (growers, traders, and millers) and provides the largest amount of rice into the markets. This channel is relatively disorganised, usually with the least sophisticated farmers, with little understanding of the markets they are producing for and selling into.
- The National Agricultural and Food Corporation (NAFCO) farms have dominated channel four. These farms are now largely bankrupt, though they control the best irrigated land for rice production in the country. As they are in the process of being privatised, it is likely that this channel is about to disappear.
- Channel three, the integrated miller/trader, is very important in terms of getting rice to the formal urban consumers, but can be unstable within the local market. In addition to buying

and milling local rice, the firms in this channel are involved in many other activities, including serving as the major importers of rice. They will arbitrage between the price of local rice and the price of imported rice, and look at the opportunity cost of their investments on an annual basis. So firms can disappear from the market for a year or two, when margins are low or it is more favourable to import rice, and then re-enter when the margins are better.

- Channel two is the most dynamic channel from a micro and small enterprise (MSE) perspective. Though still dominated by smaller farmers, producing on less than 10 acres of land, their yields are higher and more regular, they are purchasing many services, and have a better understanding of the markets. These farmers are interested in growing and in commercialising more rice, which makes them more likely candidates for adopting new approaches.

## **DRIVING FORCES**

The major forces driving the growth and business decisions within the sub-sector. These include:

- world and regional markets for rice, leading to low import prices (world market) or to increased demand from neighbouring countries which can divert rice to other markets (regional markets) drive the price of rice in Tanzania;
- local weather naturally drives local production, which can have an impact on local prices for rice;
- the large variation in the price of rice over the course of the year, which provides excellent opportunities for speculation;
- the intrinsic characteristics of rice that make it a safe product to grow and store as it maintains its value and has little loss due to infestation during storage;
- local policies on transport and levies (cess) affect the decisions taken by traders as to where to go to purchase rice, possibly discriminating against the more formalised traders, and lead to additional costs within the marketing channel; and
- competition from other crops with higher margins such as cashew or sugar cane, will drive the major miller/traders to switch the focus of their activities (cashews) or cause growers to switch out of rice production (sugar cane).

## **OPPORTUNITIES AND RECOMMENDATIONS FOR PROGRAMME ACTIVITIES**

The analysis demonstrates that the project can apply its resources to facilitate private sector solutions to enhance the growth potential of the sub-sector. Private operators should be used to the maximum extent possible to implement the steps to be taken. While this runs counter to traditional project thinking which involves providing interventions, it will lead to more sustainable impact. The challenge to the project is to engage the private operators to implement the activities because they see the economic/financial benefits in doing so.

The project should concentrate its activities in the following areas, using a number of points of leverage that are highlighted in the document:

1. Focus on the underutilised irrigated areas with high productive capacity. These areas offer optimal conditions for market led approaches to sub-sector growth:
  - There are concentrated numbers of more sophisticated actors;
  - Many services exist already, but pricing is often skewed, and they are not being used as much as economically beneficial;
  - It is much easier to share market information in close areas; and
  - There is a lot of scope for improved milling efficiency.
2. A major target of opportunity is the privatisation of the NAFCO farms. The project should remain close to the privatisation process and work closely to enhance the ability of small farmers to take advantage of the infrastructure that will be available by introducing financial products, as well as new varieties of seeds.
3. Enhance the availability of market information from the main markets to rural producers who are selling paddy to the traders. The project focus can be to determine the best way to get this information to the rural areas, whether by radio message or other the press, and develop the systems for reporting the information. Private sponsorship of the information dissemination should be sought.
4. There are a number of inefficiencies in the marketing channels, particularly due to transport pricing stemming from transport practices. Resolving the transport issues will hopefully lead to more efficient marketing of the rice. This will require more in-depth study from the policy unit within PESA.
5. Financial constraints offer important opportunities for the project to liaise with financial institutions such as the National Microfinance Bank (NMB), which has an excellent branch network, to develop two new financial products. Both products listed below offer interesting business opportunities to a commercial financial institution.
  - An important financial product from the farmer's perspective would be a warehouse credit, allowing them to get an immediate credit against their stock, which they could repay once the price rises and they sell their paddy.
  - A second financial product would be specifically for the irrigated areas and concentrate on working capital to meet the larger cash requirements needed to farm larger areas.

In addition to these five major opportunities, there are other areas where the project can apply its resources, though perhaps of less priority. These include:

- Working on developing associations or enhancing management skills of particular MSEs. Good examples would be the mills and irrigated farmers;
- The project's policy component should study the regulatory issues around the cess, its application and collection to determine its true impact;
- Investigating opportunities to market Tanzanian rice in neighbouring countries. As transport costs play an important role on the local markets in Zambia and Malawi, Tanzanian rice is already closer than rice coming from Thailand.

Finally, the project should apply economic and competitive criteria to selecting the areas in which it works. In particular, it should avoid carrying out activities in areas where other cash crops are increasing, because they will be fighting economic incentives. An example of this is the Kilombero and other potential growth areas for sugar cane.

## 1. INTRODUCTION

The DAI Private Enterprise Support Activities (PESA) project in Tanzania is designed to promote the development of micro and small enterprise (MSE) activity in a number of sub-sectors in six<sup>1</sup> of Tanzania's 21 regions. Following a review of more than twenty sub-sectors, DAI/PESA selected the rice and orange sub-sectors as initial sub-sectors to start their analysis.

Rice is extremely important in the Mbeya and Morogoro regions, and statistics show that it is playing an increasing role in the other PESA regions. The rice sub-sector study team, comprising Peter Kikoka and Mihayo Wilmore from DAI PESA staff and William Grant from Ebony Consulting International (ECI) in South Africa, spent two weeks interviewing key stakeholders in Dar Es Salaam and visiting main production areas in the PESA Regions. The team traveled to the regions of Iringa, Mbeya, and Morogoro, meeting officials and visiting key actors in the key rice production zones in those regions. This was subsequently followed up by additional field visits by Mr. Kikoka and Mr. Theodor Kaijanante.

It is important to note that the time allotted was short compared to the area to be covered and the numbers of people/stakeholders to be interviewed. While a good view of the production areas that were visited is represented in the report, it is possible that there are other production and marketing "systems" that are not captured in the study because they were not observed or were not identified in other documents. This study is also not intended to be the ultimate analysis of rice in Tanzania, as rice is a large and complex sub-sector both in Tanzania and around the world. The report will situate the rice production in the PESA regions within the overall Tanzanian framework, as well as the way that international markets impact on the Tanzanian rice sub-sector.

This analysis will focus in on the various actors in the sub-sector and their interrelationships, with a particular focus on MSEs. It will show how the sub-sector has evolved over the past decade, where it is heading, the forces that are driving the changes in the sub-sector, and the role that can be best played by the DAI PESA in strengthening the MSE growth within the sub-sector. Our ultimate goal is to provide increasing growth opportunities for MSE within the sub-sector, which must necessarily take into consideration the competition between small and large firms and understanding where the sub-sector can grow. Therefore, this analysis will also provide relevant insights into the driving forces, the points of leverage and the roles for different actors with those products. In addition to the traditional elements of an MSE focused sub-sector study, the analysis will also include more details on the range of business services that support the sector and the full range of financial transactions that occur from one step to the next.

## 2. OVERVIEW OF THE RICE SUB-SECTOR

Rice is the second most important food crop in Tanzania, following maize. Within Tanzania rice is produced in a number of regions where the climate and growing conditions are

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<sup>1</sup> Iringa, Mbeya, Morogoro, Rukwa, Ruvuma, and Tanga

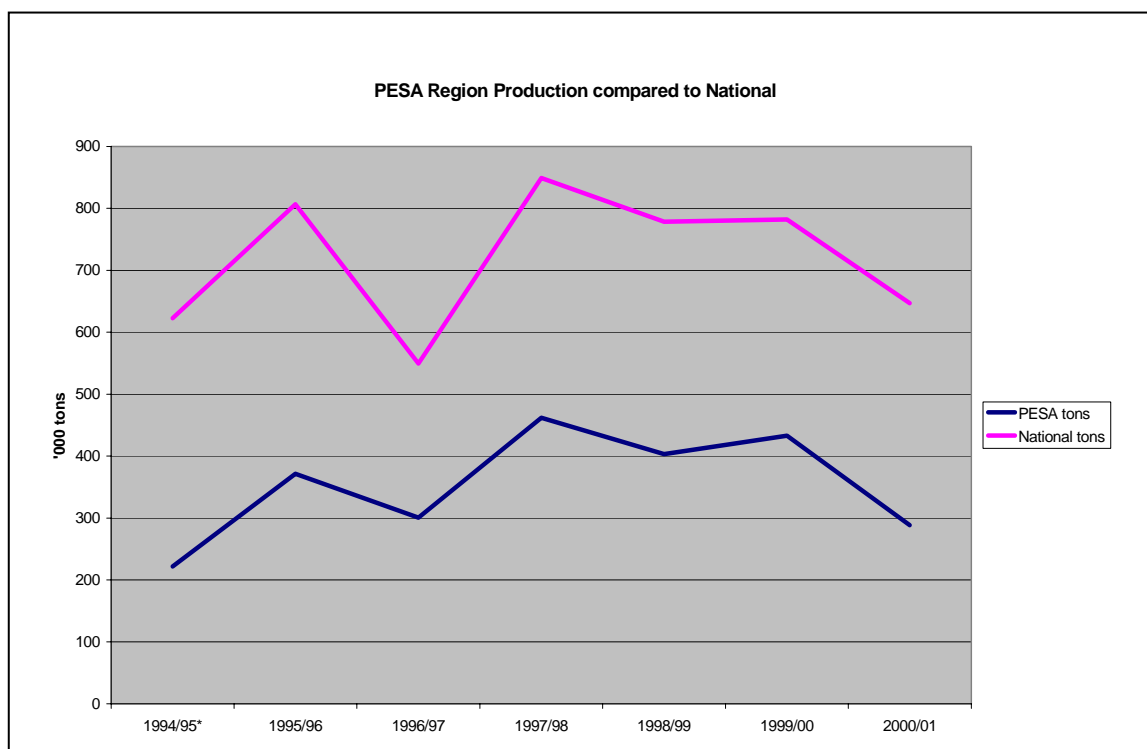
appropriate, in particular in Shinyanga, Mwanza, Morogoro, Mbeya, and Tabora regions. Most rice is produced by small holders under rainfed conditions, though there are some small village level traditional irrigation, and a few large scale modern irrigated rice farms owned by the National Agricultural Farming Corporation (NAFCO).

Rice is produced extensively in five out of the six regions being covered by the PESA project, with 281,000 farmers actively engaged in rice farming. Rice production certainly affects more than one million inhabitants in the PESA regions and plays an important role in the food security and economic livelihoods of the regions. When rice is produced in a region, it is generally in geographically concentrated areas (such as Kyela, Kapunga, or Mbarali in Mbeya region) where the conditions are appropriate. This allows for a clustering effect for the various services that are needed.

Some confusion often emanates in discussion of the rice sub-sector from the difference between “paddy” and “rice”. Paddy is the product that is produced in the fields by the farmers and it remains as paddy until it is hulled. At that point it becomes rice. The process of milling the paddy to remove the hull accounts for about a 40 percent reduction in the amount of rice that is available to be consumed, which clearly has important impacts on various calculations. Throughout the document the terms paddy and rice will be used to denote the appropriate stage in the production process up to consumption.

The functioning of the rice sub-sector has changed substantially over the past decade. At the beginning of the 1990’s most commercialized rice was still being milled and marketed by government owned businesses (parastatals). Today the sub-sector is almost entirely private sector driven. There are a few remaining NAFCO farms, and they will soon be privatized, making their irrigated farm assets available to smaller farmers. The impact of this transition has been to create thousands of opportunities for small business to get involved in transport, milling, and marketing of rice.

The statistics on paddy production in Tanzania are a little erratic. However, the team has based its analysis on the official statistics provided by the Ministry of Agriculture and Food Security. Figure 1, below, depicts the total acreage in the country under production and the total production and contrasts it with the production within the PESA region through 2000/01, which are the latest published statistics. Though the PESA region represents only ¼ of the regions in the country, it accounts for nearly 50 percent of the total tonnage produced and between 30 and 50 percent of the area under production.



**Figure 1 Area and tonnage of paddy produced nationally and in the PESA region**

The area under production appears to be quite erratic in the national production figures, but it is less erratic within the PESA regions. Similarly, there are fewer spikes in the amount of paddy produced in the PESA regions (see table 1, below).

Table 1, below, depicts the total paddy production in the PESA regions, demonstrating that Mbeya, Morogoro, and Ruvuma are the major producing regions, while Iringa produces the smallest amount. It is important to note that there was increasing production in all of the regions over a six year period from 1994/95 to 1999/00. Only in 2000/01 (two years ago) was there a reduction in tonnage produced in four out of the six regions.

**Table 1: Tonnage of paddy produced in the PESA Regions ('000 of tons)**

Region/Year	1994/95*	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Iringa	1.4	1.4	1.4	9.5	4	12.6	13.44
Mbeya	102.2	162.2	113.9	169.2	175.5	189.8	106.4
Morogoro	78.1	122.6	121.4	126.3	129.5	103.2	98.28
Rukwa	7.9	52	49.1	90	54.9	67.2	37
Ruvuma	26.7	28.3	10.9	33.1	25.8	29.8	17.08
Tanga	5.2	4.8	3.9	33.9	13.4	30.5	16
<b>PESA Total</b>	<b>221.5</b>	<b>371.3</b>	<b>300.6</b>	<b>462</b>	<b>403.1</b>	<b>433.1</b>	<b>288.2</b>
<b>National total</b>	<b>622.6</b>	<b>806.8</b>	<b>549.7</b>	<b>849.2</b>	<b>778.4</b>	<b>782.3</b>	<b>323.5</b>
<i>Percent change/annum</i>		68%	-19%	54%	-13%	7%	-33%

Source: National Statistics

As with actual tons produced, Table 2 shows that there was a decrease in the area under production in all six regions. The team was not able to ascertain the reasons for this decrease in production.

**Table 2: Area under paddy production in the PESA Regions ('000 of ha)**

Region/Year	1994/95*	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Iringa	2.5	2.5	2.5	6	3.1	8.2	5.6
Mbeya	29.7	51.7	50.5	56.4	51.9	61.7	53.2
Morogoro	57.5	78.3	77.6	48.6	65.7	67.1	37.8
Rukwa	3.1	38.5	36.3	50	29.1	29.1	18.5
Ruvuma	16.1	12.4	12.1	22	13.9	13.9	12.2
Tanga	4.1	3.9	3.9	21.2	7	14.1	10
<b>PESA Total</b>	<b>113</b>	<b>187.3</b>	<b>182.9</b>	<b>204.2</b>	<b>170.7</b>	<b>194.1</b>	<b>137.3</b>
<b>National total</b>	394	513.4	439.3	654.6	473.9	517	323.5
<i>Percent change/annum</i>		66%	-2%	12%	-16%	14%	-29%

Source: National Statistics

Overall, the rice sub-sector is a very dynamic sub-sector that shows potential for economic expansion if a number of different issues can be addressed. Production processes, milling techniques, government cess on regional exports, and the costs of transport all have important implications on the cost of the paddy that is produced and the rice that is delivered to the urban centers, which is the most important point of commercialization. There, a network of brokers takes over intermediating the ultimate sale of rice to the consumer.

An important element in the analysis of rice in Tanzania is the great difference that exists in the different types of rice produced in the country and the resulting price differences to the consumer. As will be discussed in greater detail below, retail market prices for rice can vary by fifty percent from perceived low quality rice coming from some parts of Tanzania, to the highest quality rice that emanates from Kyela District, in the Southern part of Mbeya region. This price differential provides for very important differences in buying and production patterns, transport patterns, and different milling relationships.

## 2.1 PRODUCTION PATTERNS

As noted in the overview, rice is predominately grown by smallholders under rainfed conditions. About 74 percent of total rice area is rainfed lowland rice, 20 percent is upland rice, and six percent is irrigated.

### Rice Varieties

Tanzania has traditionally grown local varieties of rice which were descended from the seeds originally imported by Arab traders before 1960. These varieties (supa) are well adapted to the climate and the tastes of the Tanzanians, but they are relatively low yielding, averaging 2.5 – 3 tons per hectare. Higher yielding varieties, such as “subarimati” from India, are less prized in the local market and command much lower prices. So despite the higher yield, the financial return is often lower. In the search for improving yields, Tanzania has invested in rice research to develop new varieties of rice which appeal to local tastes and yield higher

varieties. The Katrin Agricultural Research Center in Ifakara, is the center of rice breeding for Tanzania.

Breeders at Katrin have developed three new varieties – TXD 85 and 88 came out in 2001. These are high yielding varieties (6.5-7.5 tons/ha), but are relatively low quality. In December 2002, Katrin came out with TXD 306 which has much higher quality, but a slightly lower yield (4.5-5 tons/ha).

### **Steps in rice production**

Analysing the rice growing process demonstrates the large number of opportunities that exist for small business interventions. The growing process begins with field preparation. As the same fields are used year in and year out, there is rarely new field preparation. The farmer, in conjunction with hired labour carries out the steps listed below. The prices quoted, however, represent the total cost and therefore assume that the farmer was not contributing labour.

- First step is ploughing, done either by oxen, tractor or hoe. The cost for the ploughing is generally between 10 and 20,000 /= per acre. Many farmers have their own animals and will rent them out to neighbours, but there are relatively few independent businesses focusing on ploughing services except in the high concentration areas.
- Second main step is harrowing, that follows the ploughing to prepare the seedbed for planting. Same methods and costs apply as ploughing.
- Third step is to plant, which is usually done by broadcasting the seed, and then using the plow to cover it up. The same price applies as for ploughing and harrowing. Sometimes, fertiliser will be applied at time of planting. Seed is kept from the harvest of the previous year. No farmers interviewed actually purchased their rice seed. In irrigated rice production, some farmers plant a nursery and then transplant the seedlings a month later in determined spacing.
- Fourth is weeding. This is done by hand and is very labour intensive and expensive. The cost is between 10 and 20,000 per acre, as well. Once the field is weeded, the main application of fertiliser takes place.
- The big threat to the paddy is birds when the paddy is young, before it develops its hull. For a period of 2-4 weeks, an individual is hired to scare the birds away.
- Once the paddy is mature, it is harvested and threshed in the field by hand and put into bags. The combination of harvesting and threshing usually costs between 12 and 30,000 /= per acre. This relates to the production per acre, with the most productive farms costing more. Bags cost 350 shillings each and most are used for only one season.
- From the field, the paddy is transported by bicycle or tractor to the point of storage, which usually costs about 500 /= per bag. Each bag contains about 100 kg of paddy, though this can increase to 150 kg.
- The paddy is then stored until the time when the farmer will eat it, or sell it. There is no cost associated with storage for the farmer.

Table 3, below, demonstrates the range of gross margins that farmers earn in different areas between Mbeya Region and Morogoro region. All costs are included, even if the farmer provides them himself (including land), to provide most accurate comparison of returns. Sale

prices vary over the year (as shown in table 4, below), so an average price has been taken reflecting the times in the year when the farmer must sell paddy to cover various costs. The return assumes that the farmer sells all of his rice and then has to repurchase his seed (though this is not the case). It is important to note that farmers also rent themselves to other farmers to carry out these same functions, so the individual farmer actually has a greater overall income from farming and the related services.

**Table 3: Examples of returns from farmers in different areas (per acre, all prices in Tanzanian Shillings)**

	<b>Farmer 1</b>	<b>Farmer 2</b>	<b>Farmer 3</b>	<b>Farmer 4</b>	<b>Farmer 5</b>	<b>Farmer 6</b>
	<b>Woman 1 acre dryland farm, Kyela</b>	<b>Absentee owner, Mbarali 3 acres, local irrig.</b>	<b>Farmer in Kapunga irrig scheme, with 6 ha</b>	<b>Farmers with 1 ha in Kapunga irrig</b>	<b>1 ha in Mbarali irrig scheme</b>	<b>3 acre in Ifakara, no irrig.</b>
Land rent	10,000	10,000	12,000	12,000	20,000	10,000
Water				3,040		
Plowing	12,000	15,000	20,000	18,000	20,000	10,000
Harrowing	12,000	15,000	20,000			
Levelling					10,000	
Seed	7,000	8,750		7,200	9,000	4,000
Nursery		1,500	2,000	1,200	1,500	
Harrow				24,000	30,000	14,000
Planting	12,000	15,000	14,667	20,000	25,000	
Fertiliser	6,000		11,200	19,200	15,000	
Weeding	15,000	10,000	8,667	16,000	20,000	14,000
Bird scaring	8,000	8,000	3,333	12,000	10,000	8,000
Harvesting	5,000	5,000	12,000	24,200	30,000	10,000
Threshing	8,400	6,000				8,000
Bags	4,200	5,250	5,250	5,250	5,250	3,500
Packing	1,200	1,500	1,500			
Loading & unloading	2,400	3,000	3,000	3,000	3,000	3,000
Transport	0	10,500	7,500	7,500	10,500	5,000
<b>Total Cost</b>	<b>103,200</b>	<b>114,500</b>	<b>121,117</b>	<b>172,590</b>	<b>209,250</b>	<b>89,500</b>
<b>Avg yield (in debes)/acre</b>	96	120	120	120	120	70
<b>Avg price (debe<sup>2</sup>)</b>	2,750	2,750	2,750	2,750	2,750	1,500
<b>Revenue</b>	<b>264,000</b>	<b>330,000</b>	<b>330,000</b>	<b>330,000</b>	<b>330,000</b>	<b>105,000</b>
<b>Total return</b>	<b>160,800</b>	<b>215,500</b>	<b>208,883</b>	<b>157,410</b>	<b>120,750</b>	<b>15,500</b>
Return per bag	13,400	14,367	13,926	10,494	8,050	1,550

\*includes threshing.. Source: farmer interviews

<sup>2</sup> The “debe” is the standard measure used in Tanzania for selling rice. One “debe” equals about 14 kg of paddy and about 18 kg of milled and polished rice. There are about 7 “debess” of paddy in one standard bag, though bags can hold up to 10 “debess” of paddy.

## Production systems

There are four main rice production systems applied in the PESA regions: unbunded rainfed lowland rice (used in Morogoro); banded rainfed lowland rice (used in Mbeya's Usangu plateau); rainfed upland rice (Mbeya's Kyela District and Morogoro); irrigated rice cultivation (Morogoro, Mbeya), and small scale irrigated rice (Morogoro). The 1999 NEI Final Report on Crop and Food Studies<sup>3</sup> documents these production systems in greater detail, but we will review them quickly here.

- Unbanded rainfed lowland rice. Yields are quite good at over 1 ton of paddy per acre (3 tons per ha) due to good land preparation. Tractors are used extensively in these areas. However, there is limited use of fertilisers, manure, or herbicides. Planting is done by broadcasting the seed. Experts estimate that if better production practices were used, the yield could go up to 4.5 tons of paddy per ha.
- Banded rainfed lowland rice. This is used in low rainfall areas (such as Usangu plains in Mbeya) and the bands are needed to hold the water. Planting is done by broadcasting the seed and tractors are not commonly used. Yields vary across the country, but can reach 4 tons per ha of supa in good years.
- Rainfed upland rice. Rice production is located in poorly drained soils such as the Kyela flood plain, and is often farther away from the house. Fields are banded to keep the water on the field. Land preparation is mostly by ox plough, with some using hand hoes, and very few renting tractors. About 20 percent of the farmers use herbicides, but more apply fertilisers. Yields are about 1 ton per acre.
- Irrigated rice production:
  - Small traditional irrigation schemes are usually dependent on spring fed sources. These have often been prepared in collaboration with the Ministry of Agriculture or with regional development projects. One such scheme was visited in Mkula (Kilombero District) and provides about 100 acres of irrigated land for the village. The villagers have a local association to manage the distribution of land and water under the scheme. The parcels are small and the land is usually hand hoed. Seedlings produced in a nursery are replanted at the appropriate time. Fertilisers are used quite frequently and the yields are much better than the rainfed production, at about 4 tons per ha.
  - Large irrigation schemes, such as the NAFCO investments in Mbeya, are now becoming more available to small farmers as NAFCO is unable to exploit the expanse of their farms. In the Kapunga irrigation farm, fields are now being rented to farmers in 6 ha plots, but the uptake has been slow because of cash flow constraints to the farmers. In these large farm schemes there have been adjuncts developed for small farmers, with about 800-1,000 ha set aside. This land is rented to the farmers at about 30,000 /= per ha. On these larger schemes, which are quite concentrated, there is extensive use of tractors, inputs, and more sophisticated milling.

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<sup>3</sup> Final Reports Crop and Food Studies, Volume 2: Food Crops; Grains. Agricultural Sector Management Programme (ASMP), NEI BV, on behalf of the Ministry of Agriculture and Cooperatives, Tanzania, February 1999.

Small scale irrigation schemes exist in some PESA regions. Some have been improved through donor funding under MAFS and others are still using traditional methods. In Mbarali District (Usangu plateau) there are about 48 small-scale irrigation schemes with over 70,000 ha of potential irrigated land. About 17 schemes are developed (10,000 ha) and the rest are traditional, see Annex 3 for details. In Iringa there are two irrigated rice schemes in Pawaga Division Luganga (380 ha) and Mlonge (1,000 ha). The division has 5,000 households depending on rice.

Regularity of the supply of water is a critical consideration for rice production. Irrigated areas provide for that constraint and level out the production schedule and the timing for harvests. However, irrigated areas also need to be carefully analysed for negative environmental impacts. There is some concern that the irrigation schemes in the Madibira Scheme and others in the Usangu Plateau may lead to negative environmental impacts. The issues surrounding this must be more carefully reviewed, to ensure that environmental effects are addressed in programme actions to support rice production in those areas.

### **3. MARKETS**

There is an active market for paddy and rice throughout the year. Because both paddy and rice are easily stored and will keep from one year to the next, it is an easily marketed product that is extensively traded.

Total available rice in the country, from imports and local production, usually ranges from between 400 - 600,000 tons per annum. However, this does not take into consideration any left over stocks from previous years. It also does not take into account any rice that might be imported and then re-exported from Tanzania to neighbouring countries, particularly in the drought years.

While Tanzania produces a large percentage of what is actually consumed, the imports of between 50 and 100,000 tons per annum goes directly into the marketing chain in Dar es Salaam, accounting for a large percentage of the total of marketed rice in the country. Therefore, the price of imported rice, primarily from Thailand and other countries in Asia, plays an important role in setting prices in Tanzania at the farm level.

#### **3.1 MARKETS FOR PADDY**

Because of the combination of the non-perishability of paddy, its ease of storage free from fear of insect damage, and the storage ability of rice, it is a highly versatile product providing both food and a source of income from the marketed product. For the farmer who produces the paddy, there are numerous uses for the product. Part is sold immediately to pay off debts,, part is kept for seed for the following year, part is kept to feed the family, part is kept as in-kind savings, to be liquidated when the farmer needs cash at different points during the farming season to pay for ploughing, harrowing, planting, weeding, or harvesting.

As a result, paddy is sold at different times throughout the year, with varying prices. Farmers interviewed used different strategies for disposing of their paddy. As cash is always short right at the time of harvest, nearly all farmers will always sell at least some (if not virtually all) of their production to traders to access the cash needed to pay debts. Prices for paddy

show a seasonal variation within a year. The table below demonstrates price fluctuation for different types of paddy in the PESA regions.

**Table 4: Price fluctuations farm gate price of Paddy in PESA regions (TZS per “debe”) in 2002.**

Region (variety)	June-July	October-November	January – March	April - early May
Kyela (supa kilombero)	1,700 - 2,000 /=	3,000 /=	3,500 /=	4,000 /=
Ifakara (supa kilombero)	700-1,000 /=	1,400-1,500 /=	2,000 /=	2,500 /=
Iringa	1,500 /=	2,000 /=	2,500 /=	2,500-3,000 /=
Mbarali/Kapunga (supa)	2,000 /=	2,500 /=	3,000 /=	3,500 /=
Mbarali/Kapunga (subarimati)	1,000 /=	1,200 /=	1,500 /=	1800 /=

Source: farmer, miller, and trader interviews (March 2003).

In the PESA regions, farm prices are lowest in the period just following the harvest (Late May/June – August) and then rise gradually through the year. As shown in table 3, paddy in Kyela will sell for 2000 /= for a “debe” at harvest and then rise as high as 4,000 /= shillings just before the harvest starts again. This price increase represents two different factors, first is the increasing demand to purchase rice as stocks decrease; the second is that as paddy dries, it loses water weight (about 6 - 8 percent ), so you actually get more rice for the money, or a higher solid content per kg.

The markets for paddy are physically located in the production areas as it makes most sense to mill the product as close to the supply as possible, reducing the transport of the hulls and dust from the polish. Occasionally farmers or traders will take the paddy to a larger mill in an urban area to have it milled, but usually they prefer to have it milled as close to the point of purchase as possible. Paddy will be sold to traders either at the farm gate or be brought into nearby markets for sale.

### 3.2 DOMESTIC MARKETS FOR RICE

The main markets for rice can be divided between the rural households, the urban households, and institutions.

**Rural households.** We do not have breakdowns of the size of each of these markets, but it is certain that a large amount of the rice consumption takes place in the households of the rice producers. Depending on the location of the household, the owners will mill the rice before consumption or will husk it using traditional methods (mortar and pestle). Rural households consume large amounts of their own production and sell the rest. In rural villages, there might be a mill and some trade in rice, but this appears to be limited. Rice consumed in the rural areas comes strictly from local production.

**Urban households.** The focus on rice marketing is for the urban household, whether in regional towns or in Dar. Rice flows to the urban market from the zones of production as well as from imports. Most of the rice eaten in urban areas is purchased, not homegrown. Because of this, the urban consumer also has a much wider choice of rice. Much of the rice is

purchased on the retail produce markets in bulk (buy by the kg), though quite a bit is also purchased from supermarkets and stores in pre-packaged bags.

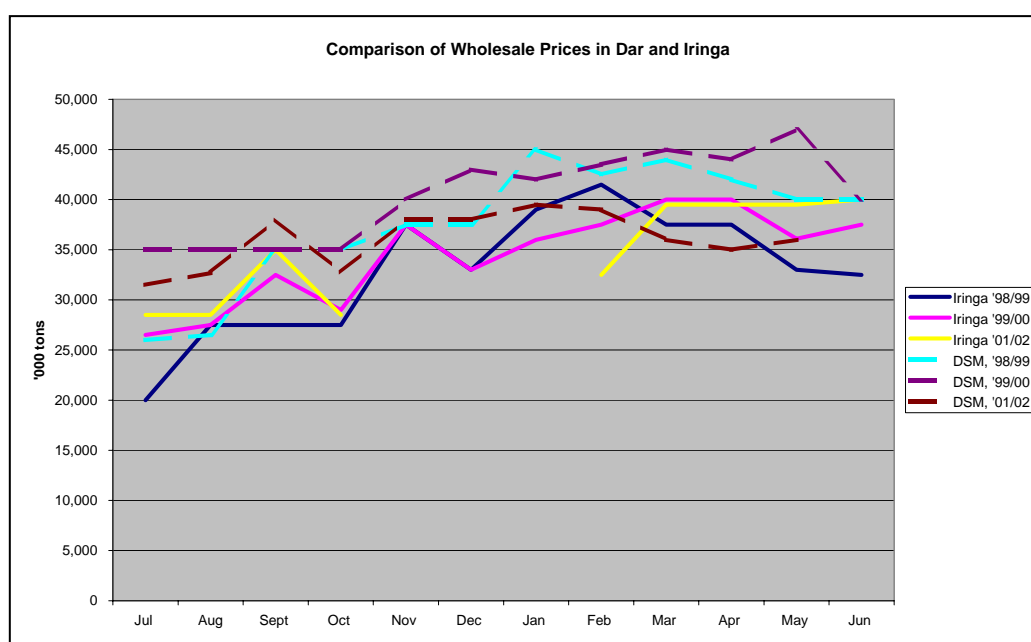
The differentiated price for paddy between the regions reflects the different prices for rice to the consumer. As noted in the overview, there can be a substantial difference in the price of rice depending on the quality of the rice. Rice from Kyela has the reputation for the highest quality in Tanzania, with a special aroma, likening it to basmati rice from India. Imported rice from Thailand, and the subarimati variety and Shinyanga rice grown in Tanzania have the lowest prices. However, mislabelling or mixing of rice in the retail markets is a fairly common practice applied to increase the selling price.

At the markets in Dar, a wide variety of rice is available to the consumer sold in bulk or by the kilo. Prices can vary by point of sale (supermarket, small kiosk, wholesale market, etc), point of origin, variety of rice, grade of rice (for those traders who grade the rice), quality of the rice (percentage of brokens), and the age of the rice. Older rice sells for a lower price than the current season's rice. At the retail level, the top price for Kyela rice in Dar was 650 /= per kg. Meanwhile broken rice was selling for about 260 /=.

While graded rice was observed in some of the stalls, there was very little grading of rice going on in the mills in the production areas, leading to skepticism as to whether the rice has really been graded.

The Ministry of Cooperatives and Marketing (MCM) collects wholesale prices for rice. A brief comparison between the wholesale price of rice in Dar and the wholesale price in Iringa (per bag) demonstrates that Iringa is constantly about 5,000 /= lower in price than wholesale prices in Dar. The prices increase as one gets farther away from the production areas. The one exception to this occurred in 2001/02 when the price for rice in Dar dropped below the price in Iringa. We assume this is because the imported rice was cheaper and more available in Dar, which had reached the peak prices for the year, as usually happens in the March to May period.

Figure 2: Wholesale price comparisons between Dar es Salaam and Iringa.



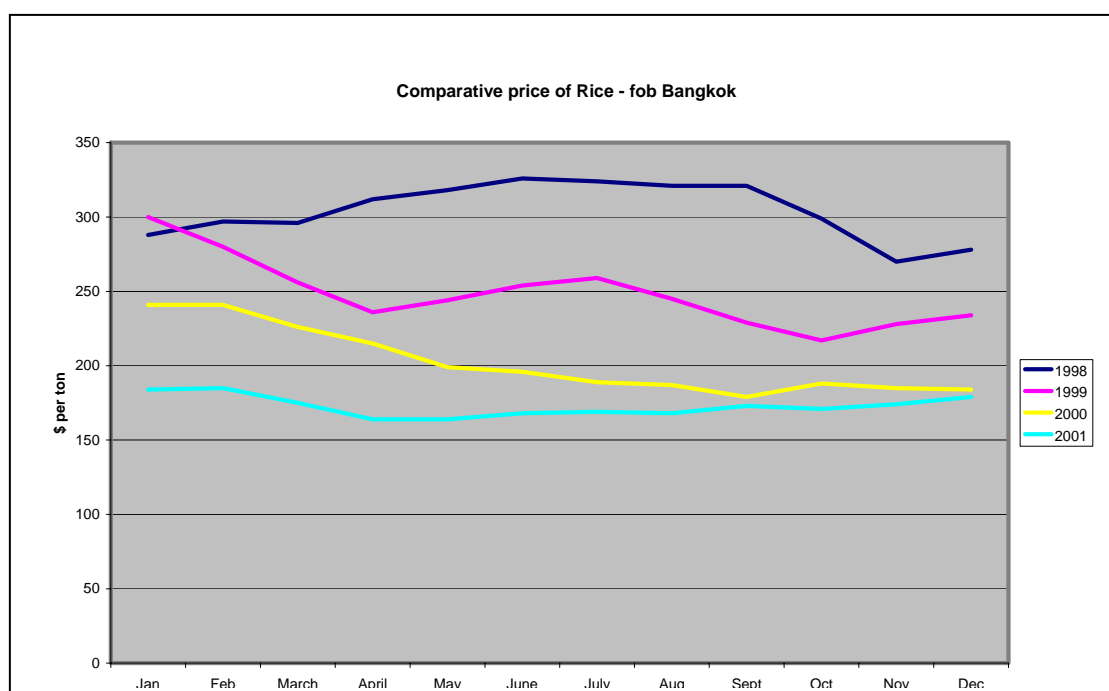
**Institutions.** The team was unable, in the short timespan, to collect any information on the institutional market for rice, which includes government departments, the school system, the armed forces, etc. The project should continue to research this area.

### 3.3 INTERNATIONAL/REGIONAL MARKETS FOR TANZANIA

While the statistics show relatively little official export of rice from Tanzania, it is now legal to do so. With the famine in neighbouring Malawi and Zambia, it is very likely that substantial quantities of rice are flowing across the borders to those two countries, as well as to Burundi, but these statistics are not captured. Some rice is exported to Kenya from the lake zone, particularly from Shinyanga. There are also some rice exports to the Gulf via Pemba/Zanzibar. Many traders from Zanzibar/Pemba have agents in the rice growing regions during the harvest time who buy substantial amounts of rice.

It is also worth noting that because rice is so highly commercialised in Tanzania, that there are reports of a steady, but informal, inflow of rice from Northern Malawi into the Kyela region. This is not captured in any statistics as it mainly comes over the border on foot.

To understand the price of rice within Tanzania, it is important to compare it with the price of rice in Thailand. The following figure demonstrates that the international price of rice has been coming down steadily over the past few years, with each year's price starting at the ending price from the year before. The price of rice shows little seasonality in Thailand, unlike in Tanzania, which should serve as a stabilizing factor on the price of rice to the consumer. It can also serve as a disincentive for local traders to become involved.



**Figure 3: Price of rice in Bangkok (fob, 1998-2001)**

## 4 THE SUB-SECTOR MAP

The sub-sector map is a visual presentation of the way that the product flows through different channels from production to the markets. The map is divided between the different functions that are carried out in getting the product from farm to the end markets. The participants are divided into channels based on their forward and backward linkages and their use of technologies that differentiate them from one another.

### 4.1 THE FUNCTIONS AND THE PARTICIPANTS

There are a great number of different functions in the rice sub-sector within Tanzania. The major functions start with research on new rice varieties and their multiplication within Tanzania, the production of the paddy, its storage and transport to the mills, the milling, the packing of the rice and loading it onto the trucks, the transport to the urban centres, and the sale through various intermediaries to the final consumer. All tolled, rice often changes hands 5-6 times between the farmer who grows the paddy and retailer who eventually sells it.

#### New seed development

This has been discussed in the production section above. Katrin Research Station is the only rice research site in the country and develops all of the new varieties.

#### Seed multiplication

From Katrin, the breeder seed is taken to the government multiplication farm at Kilangali, in Morogoro Region, or the Arusha Foundation Seed Farm where the seed is multiplied into foundation seed under the supervision of the Tanzanian Official Seed Certification Agency (TOSCA). Foundation (basic) seed is then multiplied into Registered (C-1) seed by

seed companies. There are approximately 15 seed companies in Tanzania that employ farmers to multiply the seeds for them on certified/controlled plots. For rice, Katrin has been requested to produce 100 Tons each of TXD 85, 306, and 88 for distribution to farmers.

The normal seed multiplication process is applied primarily for hybrid seeds like maize and sunflower, but there is now some multiplication of new rice varieties as well. In order to get this closer to the farmers and make it more affordable, the new varieties are being produced in a “Quality Declared Production System” which is recognised by the TOSCA. This is the level just below certified seed, but is still third or fourth generation and much better than the old “supa” varieties.

Foundation seed for rice costs 3,000 /= per kilogram, but by the time it is turned into “quality declared” rice seed, the cost is between 300 and 500 /= per kg.

## Production

Several different types of small producers were identified during the study in the PESA region, operating in different types of production systems. The main different types of rice production systems are described above. These included rainfed lowland rice (about 74 percent of total rice area in Tanzania), upland rice (20 percent), and irrigated rice (6 percent). The margin calculation for these different types of farmers are presented in table 3.

**Small traditional farmer** cultivates 1-5 acres using traditional methods. Will either plough the field by hand or will hire oxen with a plough. Occasionally a small farmer will rent a tractor. Hires lots of local labour for services to help during critical periods for planting, weeding, and harvesting/threshing. Will hire out his services to neighbours to help them either before or after working his own plots. This is the dominant type of farmer in the country and the region. Farmer earn about 150,000 /= per acre, assuming that they sell all their rice.

**Small irrigation farmer** – grows about one hectare of rice in an irrigation scheme often controlled by the government. Rents the land from the scheme, which provides him with the water. The farmer will hire labour as required to meet key functions (ploughing, planting, weeding), and then rent out his services, in turn, to neighbours to earn extra income. Gross margin can be in the range of 175,000 /= per acre.

There are also scattered small informal irrigation schemes, such as the 100 acres in Mkula (Kilombero district) which are farmed on very small plots. These endeavors have often been supported by the Ministry of Agriculture and Food Security (MAFS) Irrigation provides the farmers with the opportunity to produce more than one crop per annum, if they are industrious, and allows them to control the timing of their production to harvest when prices are at their highest.

**Larger irrigation farmer** – grows more than 5 hectares of rice in an irrigation scheme, particularly Kapunga. He out sources all ploughing and mechanised services, which are required to produce on such a large plot, and hires most of the labour for weeding, scaring the birds away, harvesting and threshing. Major concerns for the larger farmer are the financial requirements to actually carry out the various steps in the production process, as they are cash intensive. Due to economies of scale, the returns are highest to the larger farmer, reaching 250,000 /= per acre. However, there are greater financial requirements to farm the larger

areas. Many small farmers are not able to expand their production because they cannot get the cash needed to pay the larger costs associated with farming a larger area.

**Corporate rice farms** – over the years, Tanzania has invested a lot of money in NAFCO to develop two irrigation schemes in Mbeya Region and one in Morogoro. These schemes, which included large rice mills and other related agribusinesses (chickens, dairies, etc) that used by products of the rice production, are now virtually bankrupt and are producing very little rice. They are renting out their irrigated land to local farmers and providing them with access to tractor services (for a fee). NAFCO still has its own retail outlets in Dar es Salaam where it sells its own production.

### **Transport, trading and storage**

From the fields, the farmers must move their paddy to storage before it is milled. This is usually done using bicycles, tractors, or other means of transport, which are often rented. For a small farmer, storage is usually within the house, but for a larger farmer, they might take their paddy to an old cooperative storage shed or directly to a mill, where storage is often provided free for up to a year. For local farmers or farmer/traders, there is very little cost to storing locally, but for external traders who come to purchase and stock, then they must rent places to store the paddy.

Much of the trading between harvest and milling is actually carried out by local traders and farmers, who will purchase and store the paddy until the price goes up. Sometimes the trader intervenes just for a single transaction lasting less than a day, to purchase a number of bags of paddy in the market and then take them to the mill. At that point the rice is sold to the eventual buyer who is waiting outside the mill. Some of the different actors at this point include:

**Farmer** grows the paddy and then stores it until he needs the money for other things: plowing, harrowing, planting, other cash requirements. He will eat several bags and sell the rest at his house or in the market to meet his cash flow requirements.

**Farmer trader** grows the paddy and stores it. Will often buy a little bit extra and store it and then take it to the mill and have it milled into rice which is then sold to a trader. On occasion, the farmer/trader will monitor the price of rice in the wholesale markets and will organise the sale of his rice in the end market through a broker, who helps to organise the transport.

**Local paddy speculator/trader** buys paddy at harvest when prices are lowest and then stores it until the market reaches peak price in January – March. Does not pay for storage, either storing at own premises or leaving it at the mill. Depending on the region and the turnover of rice, the miller usually stores it for free for up to six months to ensure that the trader will mill the rice in his mill. Trader then pays for the milling of the rice. Frequently the millers will play the role of local speculator trader, buying from farmers and then storing for milling and sale to regional traders.

**Local spot paddy trader** buys paddy in the market and moves the product to the mill. He finds a regional buyer, agrees on a price and then pays to have the paddy milled into rice. He pays for the transport to the mill (200/=) and getting the bag inside the mill (100/=). He also pays the milling fee.

**Local rice trader** buys rice at the mill from the local paddy trader and then sells it locally to housewives, etc. For local trade, bags do not need to be carefully packed.

**Integrated miller/trader**, such as Mohammed Enterprises Tanzania Ltd (METL) and Fida Hussein and Co.Ltd (FIDHUSCO), (see below for more information), who purchases paddy from the farmer either directly or using agents, and then mills the paddy into rice, and transports the product to the end market. They may use their own trucks (as does METL) or rent trucks (FIDHUSCO). There is usually at least one regionally based miller/trader in each of the key rice production areas, though they are not well known, such as Agro Impex in Ifakara.

The large miller/traders are also the major rice importers into the country. They often arbitrage between the profitability of imported rice compared to locally purchased paddy that they will mill and then trade. As noted in figure 3, the international price of rice fell steadily from 1998 to 2001. METL and Fidahussein both actively compare the price of imported rice vs. locally produced rice (see example in tables five and six, below). Even though the taste of Thai rice is not appreciated in the market, when the price is low enough, it will take precedence over the more expensive local rice, regardless of taste. The international price has recovered a little, so it is now financially interesting once again for large traders to buy locally.

The integrated miller/traders also has many other activities that they are pursuing, such as cashews, sisal which can offer higher margins to rice, leading to an impetus to shift away from rice.

## **Milling**

Milling is a central function in the rice sub-sector. All paddy must be milled before the rice can be eaten. But due to the superior storage ability of paddy milling usually happens as close to the time of consumption as possible. Traditionally, farmwives would do this by mortar and pestle, but today, nearly all rice is milled in electric or diesel rice mills that hull and polish the rice, unless the farm is too far away from a rice mill.

While the owner of the mill usually employs only 2-3 people who manage and maintain the mill, there are usually another 6-7 piece workers who are present to help with the other aspects of the milling. During peak season, the number of piece workers can increase to 20. These include moving the paddy into the mill, taking the rice from the mill, filling the bags by tamping them down, and loading the trucks.

The mill is the hub of much of activity in the rice sub-sector:

- The local trader brings the paddy to the mill and the regional traders are often waiting to buy the milled rice when it comes out. He will strike the deal with the rice trader before paying to have the rice milled.
- The piece workers at the mill charge the trader to move the paddy from the bag and into the mill, where the mill operator puts it through the mill (cost is about 200/= to move the rice to the mill).
- Then pieceworkers move the rice from the mill to the bags and fill the bags. Because the

cess is charged by the bag, the bags are heavily tamped down increasing the weight from 180 kg per bag to up to 220 kg per bag. Pieceworkers will sometimes sew extra bags together before tamping them down very tight to maximise weight per load, and will then sew the bag shut. The cost is about 300-400/=.

- The mill operator usually gets a small tip (100/= or more) for milling the rice.
- Once the deal is struck between the local paddy trader and the regional trader, the pieceworkers are then paid to load the truck at roughly 500/= per bag.

During the busy periods a good pieceworker can earn up to 7,000/= a day from moving paddy, filling bags, and loading trucks. Meanwhile, the mill operator normally earns 40,000/= per month from the owner of the mill, but they can earn another 5,000/= per day in tips, which makes it worthwhile. While the piecework at the mills is a little more erratic than a full time job, pieceworkers noted that a worker in the sugar mill in Kilombero gets paid 1,700 /= per day, so they are much happier to be earning four times that amount.

The cost of milling the rice varies by region and by process. The bigger mills in Mbarali have invested in add-ons to the mills that do a very careful job of sorting the rice between broken and different grades. Milling charges are either by the debe or by the bag. In Iringa, the price to mill a bag is 1000/= . They charge 200 /= per debe. In Mbarali, where they have more specialised mills, the charge is 1200 /= per bag and 250 /= per debe.

There are a number of waste products that have (or may have) value in the milling process:

- The hulls from the paddy are blown out of the mill and pile up. In urban areas, the miller must pay to have this removed (20,000/= per truck load). In the more rural towns, the piles get very high, but are often used by local farmers in their fields as mulch or as sources of fuel for brick burning. This is not sold, as the millers are just glad to have the piles removed. Given their combustible properties, with some technological application, the hulls could be compressed into bricks and sold as a very high-energy source of fuel.
- The polish “powder” gets blown into a separate pile. This can be sold as feed for animals, especially pigs (price of about 100/= per debe). In some of the poorer areas, poor women will sift through the powder to cull out the small quantity of broken rice that they can then take home and eat or prepare rice buns (vitumbua) for resale.

## Regional Trade

From the mill, different traders take up the rice and transport it to the end markets, though sometimes they are the same ones as those who purchase at the farm or local market level. In this case they will only contract out the milling function.

**The regional trader** buys rice at the mill, buys empty bags, then pays for the filling of the bags (200-400/=), loading into the truck (500/=). Transports to Dar es Salaam, and will pay for the cess along the way.

**The integrated regional trader** buys paddy at the farm or in the market, stores it and then has it milled, usually in the region. He will store it in rented go-downs or houses in the villages or for free at the mill (depending on the level of activity at the mill). He contracts the miller to mill it by the bag. He takes it to the destination market (Dar or other) and then

sells it through brokers. This is in contrast to the **integrated miller/trader**, who does his own milling and packaging and will then sell to supermarkets, institutions and other stores.

**The wholesaler/trader** is usually based in the wholesale market, but will go back to the rice mills to purchase from the local traders. He will dispose of all the rice himself and is able to bypass the broker stage (as he is the broker).

**Rice importers** are primarily the same individuals as the integrated miller/trader. This allows them to arbitrage between local purchases and imports. If they import, they will then use their milling facilities to put the rice into bags for sale. The contrast in prices that they must compare are presented below<sup>4</sup>:

**Table 5: Landed price of imported rice from Vietnam or Thailand**

Price of rice f.o.b.	\$140
Freight	\$30
Tax	\$25
Total landed price, Dar	\$195 or TZS 195/kg
Sale price on the street	TZS 280

**Table 6: Dollar comparison with domestic price of rice for larger miller/trader (mill in Dar)**

Cost (\$/ton)	Ifakara
Purchase price (farm gate)	\$ 100 - \$145
Levy	\$ 7
Labour (accommodation + commission)	\$ 5.6
Transport to collect and take to depot	\$ 5.9
Transport to Dar	\$ 22
Bulk bags	\$ 5
Milling cost	\$ 16
Grading cost	\$ 3
Packing cost	\$ 9
Total landed, processed and packaged cost	\$173.5 – 218.5 per ton TZS 173 – 218 /kg

Tables 5 & 6 demonstrate that it can be advantageous from a price perspective for the larger miller trader to import rather than to invest in the infrastructure needed to purchase, mill and market the product locally.

## 4.2 MARKETING FUNCTIONS

The marketing of rice in the urban areas of Tanzania through the informal market system is quite complex. Brokers play a critical coordinating role in the entire process. Figure 4 below presents the relationships between the different actors, flowing through the brokers.

### Broker

The broker is one of the most influential actors in the sub-sector and serves a very important coordinating and financing role. The broker never takes ownership of the product but

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<sup>4</sup> Source: local trader involved in the local purchasing and packaging, as well as the import export business.

receives it from either the regional trader or the farmer/trader. Brokers operate differently in the various markets. To dispose of a large load of rice (50 bags), at values of up to 90-100,000/= per bag means that they must go to several wholesalers. The broker pays the transporter, offloads the rice, stores it (paying storage fees of 100/= bag). The broker sets the price with the farmer/trader and then disposes of it at the rate that he can get, which is often higher than the agreed price with the trader. Pending on the market, he may then employ touters who will hawk the bags to wholesalers and will take 20-30 /= additional mark-up.

There are two principal wholesale markets for rice in Dar, Tandika market and Tandale market, each with its own characteristics and serving different types of end markets. Tandale market has at least 50 brokers, while Tandika market only has about 10 important brokers. Figure 4, below presents the relationship in Tandale market, where the brokers are smaller, but deal in higher value rice from Mbeya, etc, and serve the higher end market. In contrast, Tandika market serves a lower end market that is more price sensitive and less quality sensitive. While Tandale gets most of its rice from Mbeya and Morogoro, Tandika brokers tend to receive rice from Shinyanga, which is substantially cheaper (current prices are only 280/= kg at the mill, as opposed to 350 /= for Kilombero or 400 /= for Kyela rice.)

The brokers in Tandika have their own warehouses where they can store the rice while waiting to transfer it to wholesalers or to retail shops. Broker will deal with 5-10 main suppliers who entrust their rice to him, for which he takes a fee of 5-10 /= per kg. Tandika brokers appear to serve the dual role of wholesaler as well, selling to a large number of shop keepers and retailers in the peripheral markets. Because Tandika gets most of its rice from Shinyanga, it wholesales rice for 50-100 /= less per kg than in Tandale, which is appropriate for the lower end market that it serves. Directly employing very few people (one or two clerks) there is also a steady flow of piece work for day labourers around the brokers loading and unloading trucks.

Ultimately, the brokers exercise important control of the sub-sector. Discussion with local/regional traders who try to access the wholesale markets without going through the brokers, shows that the brokers can freeze them out. Brokers appear to prefer to deal with regular clients, and will take advantage of unsophisticated local traders.

### **Wholesaler**

The wholesalers will buy a number of bags from the brokers in the urban areas and then sell them to the retailers. Some of the wholesalers also retail, providing a double function. Some of them will also go to the mills directly and purchase the rice from the local traders if they can raise enough capital to buy a truckload (valued at about 2 million /=), pay the transport and then hold the merchandise.

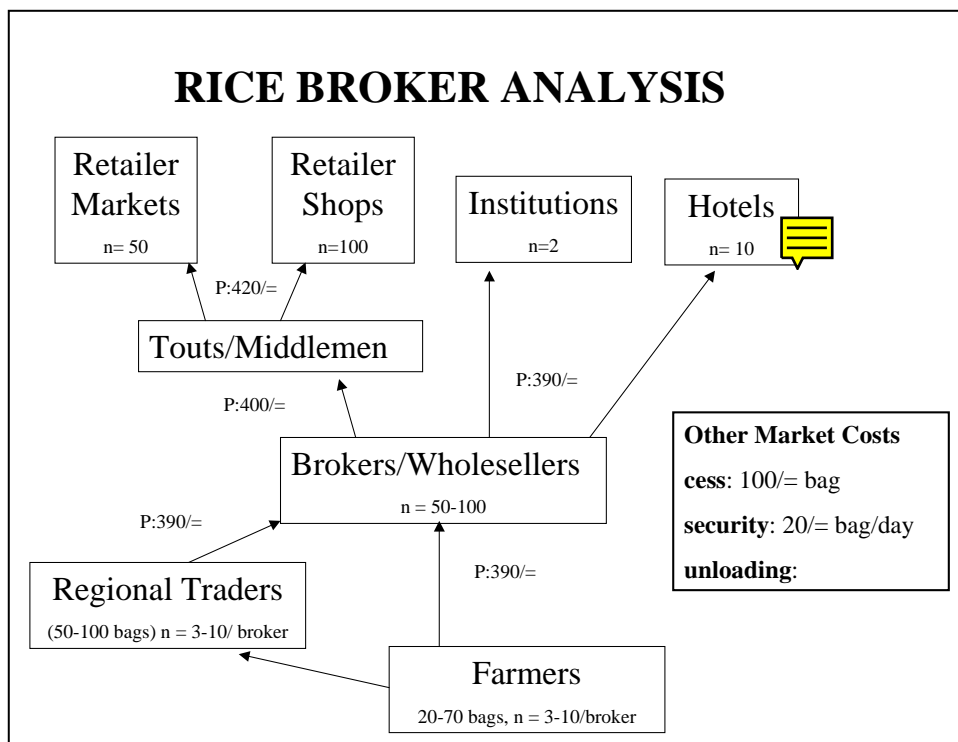
There are advantages for them to purchase just a few bags at a time, and then to turn this over more quickly, relying on the brokers to supply them on a regular basis with new stock at the two wholesale markets.

### **Retailer**

There are several different types of retailers: those in the big urban centers, the smaller urban centers closer to the rice producing areas, and at the village level. In the smaller urban

centers and the villages, the retailers purchase directly from the local traders at the mill and then add about a 10 – 15 percent mark-up and sell the rice locally.

**Figure 4: Rice Broker/Wholesale/Retail relationship in the Tandale Wholesale market in Dar (n= number of enterprises dealing with each broker)**



### 4.3 THE TECHNOLOGIES

There are different technologies used in most of the functions, such as the type of seed that is used, the mechanisms used to plough the fields, whether the rice is irrigated or rainfed. The main differentiating technologies in the way the rice is produced, milled and transported are highlighted below.

#### Production

The main differences in technology used in production relate to ploughing (whether by oxen, hoe, or tractor) and planting (whether broadcast or transplanted from a nursery). In areas where there is a large concentration of production, there is increasing use of tractors as more farmers invest in them. Particularly in the irrigated areas, where the evidence of a market economy is strongest due to the large rice production, there is a range of services available to the farmers. Transplanting is most commonly done in the irrigated areas, but allows the farmer better control of the timing of the production and harvest.

#### Milling

Most of the mills are of Chinese origin and are powered by electric or diesel motors. Kirlosker supplies Indian motors, selling about 500 units per year for milling various crops – in particular maize and paddy. In the areas visited by the project team, electricity was usually available, so most mills seen were electric. The most common electric mills are sold by Auto

Sokoni, based in Dar, but with offices all over the country. There are other distributors as well, but they have much smaller reach into the market.

## Transport

The two main modes of transport for rice to get from the mills to Dar es Salaam and the urban markets are by truck and by train. There is price sensitivity between the two and it is not clear exactly when one mode is preferred over the other. In Mbeya, no company cited using the train, all of them used trucks. However, in Ifakara, the larger traders shipped their rice by train to Dar.

The difference between the two modes is related to the availability of cheaper forms of transport. There is a lot of truck traffic coming through Mbeya, and along the main paved road, returning from Zambia. The fact that they can get cheaper backhaul rates and that there is a great frequency of trucks makes it easy and cheap to use trucks. In contrast, Ifakara is at the end of a long, poorly maintained dirt road. The cost of truck transport from Ifakara to Dar (3,500 – 4,000/=) is nearly as high as from Mbeya, even though it is much closer. In contrast, the price of rail transport is much lower from Ifakara than it is from Mbeya, making the train a better option for large quantities.

There are important implications for the transport of rice by rail compared to trucks. First of all, rail is more transparent and therefore subject to the cess. Secondly, the weight is measured and it is difficult to get around it by overstuffing bags, as traders do with trucks, so there is a smaller fee to fill the bags (savings of 1/= per kg). Thirdly, since it comes in and out of the train depots, there needs to be an organised receiver in Dar. Therefore, the train might be a viable option for a large shipper, with the systems and facilities, but it is not a viable option for the small trader.

**Table 7: Comparative transport costs for rice by mode and origin to Dar.**

Transport costs					
	Train from Ifakara	Truck from Ifakara	Train from Mbeya	Truck from Mbeya	Truck from Iringa
Filling	1	2	1	2	2
Loading	1	2.5	1	2.5	1.5
Unloading	2	2.5	2	2.5	2.5
Transport (kg)	15	20	41	25	16 - 23
<b>Total cost of transport</b>	<b>19</b>	<b>27</b>	<b>45</b>	<b>32</b>	<b>22 - 29</b>

Source: Field interviews and posted freight rates for train.

## 4.4 THE CHANNELS

The team identified four main channels through which the product passes from production of paddy to rice to the end consumer. These channels are differentiated by the technologies that they use and the relationships (buying, selling, sub-contracting) between the different participants in the sub-sector. These channels are not intended to be all encompassing, but represent the majority of the different kinds of relationships that are encountered.

The first channel, the **traditional farmer/trader channel**, is by far the largest and includes the traditional rice growers who are producing 1-5 acres of rice on rainfed lowland or

upland farms. This probably accounts for 94 percent of the total number of the growers /producers in the rice sub-sector. These farmers will sell to local traders who will then on-sell to regional traders after milling. Production methods tend to be traditional using oxen for ploughing, and producing relatively small quantities of rice per farm. The relationships are often a little disjointed, characterised by lack of good flow of market information and greater disconnect between the farmer and the market.

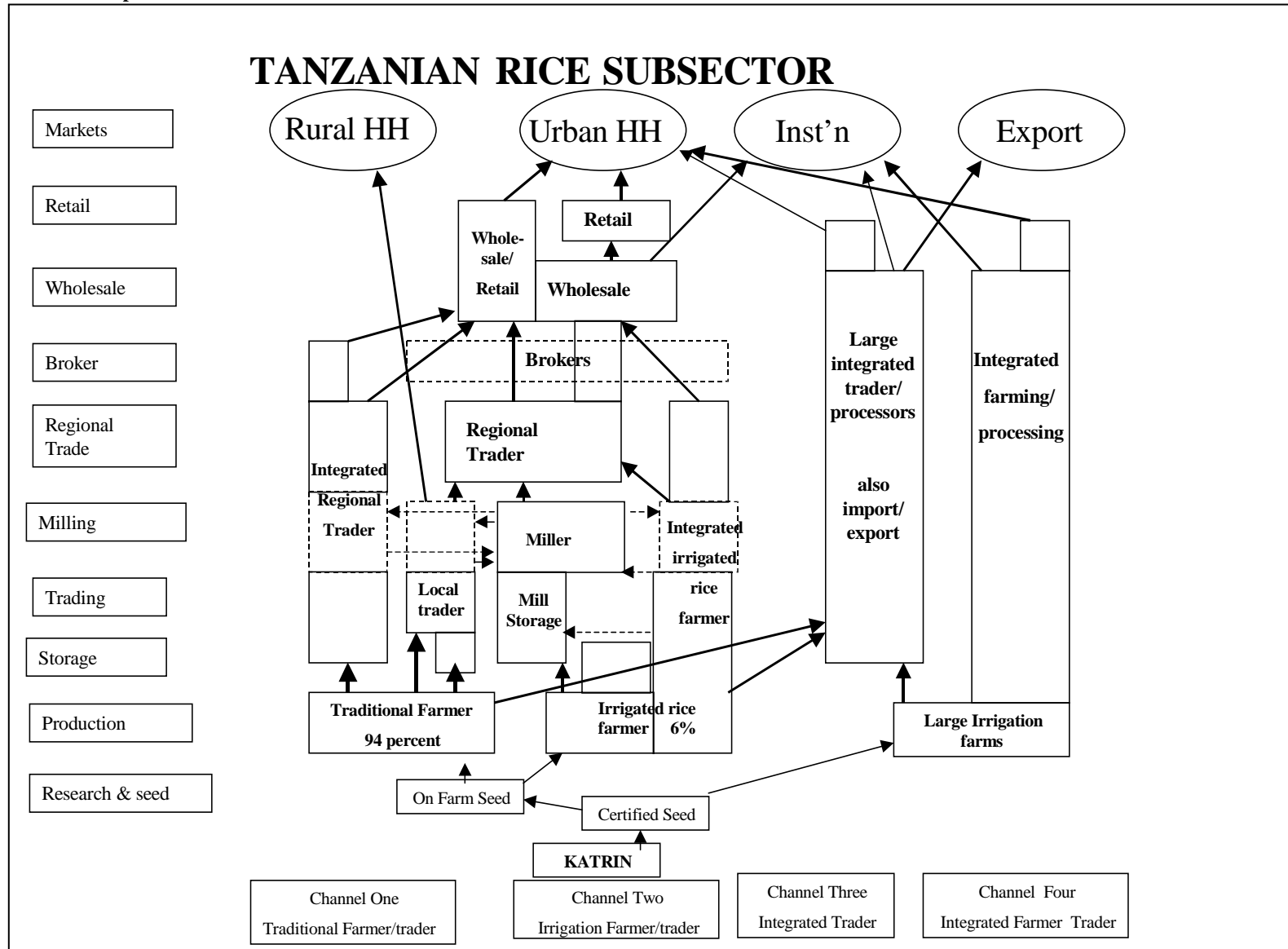
The second channel, the **irrigated farmer channel**, operates in much the same way as channel one, except that productivity is much higher on their fields and more regular. Because of the control of water, they can alter the timing of their production to meet peak demand times better. Because the irrigated production zones are concentrated and have higher yields, there is a greater concentration of other services (tractor, farm equipment and supplies, repairs, etc.) available to support them and the milling services are often more sophisticated offering farmers/traders a greater choice of products. In addition, as the farmers often produce greater quantities of rice, they sometimes organise their own marketing direct to the brokers. They tend to have better price information and are in more regular contact with the brokers in Dar.

The third channel is the **integrated miller/trader channel**. In this channel, the miller/trader purchases large quantities of rice and mills them in their own mills and bags them for sale to supermarkets. The largest of these, METL operates on a national scale, and has 6 mills strategically located around the country and networks of agents and go-downs to purchase and store the paddy. However, there is usually at least one integrated miller/trader in each of the main producing regions.

Channel three provides many contrasts. Though the integrated miller/traders are major players in the sub-sector, there are relatively few firms in the channel. As important importers as well, they are constantly weighing the advantages of buying locally versus importing. If it is more cost effective to import, or if they have more remunerative opportunities for their limited funds in other areas, then they can cease local buying activities for a year, supplying their markets through imports. Their actions are largely dictated by the international price of rice.

The fourth channel is the **integrated farmer/miller/trader channel**. This channel currently includes only two or three large farms owned by NAFCO. They grow paddy on large irrigated farms with the best conditions and the best equipment. They mill the rice in huge industrial mills at the farm sites. NAFCO also has its own trucks and a store in Dar that markets the farm production for them. The quantity of rice flowing through this channel has been shrinking steadily over the years because NAFCO is not commercially adept and there are too many disincentives in the system for them to function efficiently. From an estimated potential production of 30,000 tons of paddy, they are currently producing about 2,500 tons of paddy. This equates to about 1,500 tons of rice per annum.

Figure 5: Rice sub-sector map



## 4.6 BUSINESS SERVICES IN THE SUB-SECTOR

One of the critical elements in determining the optimal programmes to support MSE development within a sub-sector is to understand where the business opportunities lie and what business services are supporting the sub-sector. As noted under the list of participants, above, a great many different services are being provided. There are as many as 35 different cash transactions that can take place in the process from acquiring the seed to the point of sale of the rice to the final consumer.

Function	Services	Business
Seed development	Research, seed multiplication	Seed companies, seed multiplication farmers
Input supply	Sale of seeds, fertiliser, herbicide	Input suppliers
Production	Input purchase, plowing, harrowing, planting, weeding, bird scaring	Plowing services, tractor/plow rental
Harvest	Labour to harvest, thresh,	Equipment rental
Storage	Move to storage, unload, rent storage	Transport
Local trader	Move to market,	Transport
Milling	Transport to mill, move into mill, mill, move from mill to bag,	Milling, equipment sales, spare parts, piecework
Trading	Bag, load truck, transport,	Transport
Brokering	Unloading transport, market storage, touting, security	Broker, Security, touts, pieceworkers
Wholesale and Retail	Transport, selling	Small shops/stalls

With so much business activity in the sub-sector, any interventions by the project must take into consideration the effect that these will have on those businesses. In addition, looking to the long term sustainability and success of any identified solutions, the project must see how it can involve and use the private sector to actually implement the solutions, by facilitating their involvement. This might be more time consuming, initially, but will yield greater, more sustainable results in the long run.

## **5 INSTITUTIONAL AND REGULATORY FRAMEWORK**

Since liberalisation in the late 1980's, there has been a steady trend towards increasing private sector activity. Still in the early 1990's NAFCO and the National Milling Corporation (NMC) were milling the majority of rice that was commercialised and being marketed through government controlled institutions. However, by the turn of the century, the government involvement in the sector has evolved greatly.

### **5.1 INSTITUTIONAL**

There are a number of governmental institutions that play a role in the rice sub-sector. Most of these have already been discussed above, such as the SGR which controls exports, TOSCA which supervises the certification of new seeds, and the Agricultural Research center at Katrin. DAI PESA should continue to stay in touch with these institutions. In addition, PESA needs to collect more information on the controlled sale of rice provided by Japan.

Institutions that have not yet been discussed are the two ministries that used to comprise the Ministry of Agriculture and Cooperatives, now the Ministry of Agriculture and Food Security (MAFS) and the Ministry of Cooperatives and Marketing (MCM). PESA should develop good relations with both of these ministries as they can both provide access to important resources. The MCM collects all of the price information, not just for rice but for all agricultural products in the wholesale markets. Meanwhile the MAFS is the host ministry for the Agricultural Sector Management Programme (ASMP) which can be an active partner. The MAFS also employs the agricultural staff in the regions and districts, who should be allies of the project.

Private associations, such as the Tanzania Farmers Association, are only peripherally involved in rice production.

Though NAFCO is disappearing, the infrastructure that it manages for rice production will play an important role into the future. Therefore the process of transferring the NAFCO assets to the private sector will be a very important one to manage properly in order to enhance the opportunities for MSE, as well as to ensure that they do not get wasted.

### **5.2 REGULATORY**

Overall, the rice sub-sector is not heavily regulated. The main areas where regulation occurs is for exports (regulated by the Strategic Grain Reserve) and at the district cess. In addition, since transport represents a fairly significant portion of the end market price of the rice (about 10 percent on average), gaining a better understanding of the transport sector, the policies governing it and the behaviour driving it will be important.

- Export permits are required for anyone who desires to export rice from Tanzania. The Director of the Strategic Grain Reserve (SGR) issues these permits. While we were unable to collect actual statistics on rice exports as they are not reported on by the Tanzanian Customs Authority, there are export permits being issued for exports going primarily to

Zambia, Malawi, Burundi, Rwanda, and the DRC. The large exporters who will be exporting are exporting rice that has been imported from Asia or sometimes purchased at the auction (see below). But there is probably a much greater amount of rice exported informally to neighbouring countries in small loads that are not regulated.

- The Japanese donate rice each year to Tanzania, which the government sells by auction and the proceeds go to Agricultural Development funds. Questions were raised about who gains access to the auction and how the pricing is actually effected. There were reports that the auction often serves as a source for a privileged few companies, but there was no substantiation of this.
- The cess, supposedly charged at the district level on each bag of rice leaving the district, plays affects the cost of marketing. There are questions of whether the cess is actually paid on a regular basis, but the fact that it exists means that it will add costs to the traders, either in terms of actual payments to the collectors, or in payoffs to the collectors.

Since the cess varies by each district, there can be an effective impact on the price per district depending on the relative cess. For example, Ifakara has placed a cess of 1000/= per bag of rice which is much higher than in Iringa (700/=) and Kyela (400/=). When this is factored into the higher costs of transport and the lower value of the Ifakara rice compared to the rice from other regions, it does hinder the competitive advantage of Ifakara rice.

## 6. SUB-SECTOR DYNAMICS

Overall, the sub-sector has been shifting towards greater private interaction. Since the mid 1990's there has been a strong growth in the private milling capacity as small mills have replaced the NMC mills, taking the processing much closer to the farms which is economically sound. Channel one, the traditional farmer and trader channel has benefited from the growth in local milling capacity, as has channel two. This growth in small milling capacity has, however, created greater competition for the integrated milling/trading firms in channel three, increasing the role for small local traders to buy and sell to the regional traders.

When comparing the different channels in the sub-sector, there have been major changes over the past decade. One is clearly disappearing (channel four) and one appears to be gaining in impetus (channel two – small irrigated farmer). The two are related, as the same irrigated land is often used by both. The project can take advantage of the disappearance of channel four by focusing its efforts on enhancing the ability of the local farmers to take up the land that will become available from NAFCO.

The amount of rice grown in Tanzania passing channel three can increase or shrink depending on the world market prices, as well as the availability of funds to the corporations running these activities. Since the activity is usually just one of many that they manage, funds may be allocated or withdrawn from the sector depending on the opportunities facing the companies and the financial needs that accompany those opportunities.

With the privatisation of the large irrigated rice farms in Mbarali and Kapunga, the irrigated land that will now be available to smaller farmers will provide many opportunities for increased growth of MSE in the sub-sector, if it is properly managed.

### 6.1 DRIVING FORCES

A number of different forces are driving the dynamics within the sub-sector and whether there are growth opportunities. These forces range from market prices, weather, the qualities of rice, transport, and competition from other crops. The relationship of these forces and how they impact on the decisions of the actors within the sub-sector provide very important insights into the best kinds of activities that the project can implement to have impact on MSE.

#### Market prices of rice

**World market.** Tanzania imports up to 100,000 tons of rice per year, which means that it is part of the world rice economy. Since the market price of rice in Tanzania (and hence paddy in the rural areas) is driven from the local price in Dar, the major factors that enter into the price calculation are the world market price as well as the amount of local production. As the world market price of rice drops, it becomes more interesting to import rice at the expense of local production. This can have a major impact on the price incentives for local production.

**Regional market.** The Tanzanian market is primarily focussed towards Dar es Salaam, but there has been pressure on local prices from the famine in Malawi and Zambia, drawing some

formal and informal rice exports to the countries to the North and West of Tanzania. This must be factored in with the effects of the world market price for rice. Ultimately it might mean that there is greater potential for rice to be shipped towards Zambia and Malawi, and not towards Dar.

### **Local policies**

The main policies affecting the sub-sector relate to the local levies (cess), transport, and export regulations. While the precise effect of each of these is difficult to assess, we note that they do lead to changes in behaviour:

- levels of cess can lead traders to choose one area over another, as witnessed in Ifakara when the local authorities doubled the cess; and
- transporter and trader behaviour, due to the cess and other factors affecting transport, leads to behaviour that makes short term economic sense, but might be economically inefficient over the long term.

### **Local price patterns over the year.**

The price at the farm gate can nearly double over the course of the year, driven by the farmer's need to get cash at harvest to meet expenses, and the steadily decreasing supply towards the end of the year. This great price difference, provides many opportunities for speculation, adding a certain element of risk to the market for larger players with greater investment capacity.

### **Weather**

Weather is always critical in agricultural production as it can have major impacts on yields and hence on prices. It can favour one region over another, adding risk to the entire sub-sector. Hence elements that can reduce the vagaries that weather brings upon the sub-sector (such as irrigation) are important for the long term growth of the sub-sector.

### **Transport**

The cost of transport, particularly on bad roads such as those to Ifakara, are major factors in determining where the traders go first to buy paddy, or force down the price to the producers to factor in the added costs associated with the bad roads.

### **Competition from other crops**

For most farmers, rice is first and foremost a food crop, with the surplus being sold off to meet costs for producing the next crop or other financial needs. Because of its durable nature which enhances the farmer's options with respect to storage and transport, rice becomes a very good cash crop to produce when there are few other options for crops that can be marketed. However, when rice farmers are faced with a choice of producing rice or another crop that is of higher value and can be easily marketed, they will switch.

In the Kilombero region, it was apparent that the much higher cash crop value of sugar cane, compared to rice, was driving significant amounts of rice farmers to switch out of rice and into sugarcane. The South African Illovo sugar company has purchased the old sugar mill and is investing heavily in the sector to increase production. Since sugar cane can earn a farmer 3-4 times as much per acre compared to rice, the farmers are switching. This is reversing the opposite trend, witnessed 5-6 years ago, where due to the demise of the old sugar mill, farmers switched out of sugarcane and into rice. The implications for the project are to not invest in trying to promote rice in areas where there is a functioning sugar mill or other major investments to promote the marketing of more remunerative crops.

## 6.2 POINTS OF LEVERAGE

The points of leverage are those points in the sub-sector where applying a small amount of pressure will lead to a fairly large impact. This is extremely important when trying to work with micro and small enterprises (MSE) which are very difficult to reach on an individual basis. There are generally three main sources of leverage in a sub-sector:

- system nodes, or those points in the sub-sector where a single firm is in contact with a much larger number of firms;
- geographic clusters where there are large concentrations of targeted firms; and
- policies, where a decision taken at a central level has a broad reaching impact on a large number of firms in the sub-sector.

### System Nodes

**The mills.** The rice mills provide an excellent point of leverage for reaching rice growers and local traders. An average mill will typically deal with up to 200 different local traders selling paddy and serve as the market point for another 50 regional traders who purchase from the local traders. In addition, many farmers come to the mills to have their own rice milled.

**Equipment suppliers.** It was noted that many mills were inefficiently laid out and did not have optimal milling conditions. In terms of introducing new technology to the mills, the main supplier of rice mills, Auto Sokoni could be an excellent point of leverage.

**Tractor service providers.** In the major rice producing areas, particularly in the irrigated areas, a limited number of tractor service providers deal with many small farmers. These service providers, who are usually farmers themselves, but also more astute farmers, can serve as focal points for transmitting information to the producers.

**The large processor/traders.** These firms, through their agents and purchases from local traders, interact with large numbers of farmers and local stakeholders. They can serve as an important point for transmitting information to farmers and other stakeholders on changes in the sub-sector and to push new ideas into the sub-sector.

**Traders, brokers.** These actors always serve as important points of contact within the sector as they each deal with large numbers of participants. However, because of their informal

nature and their often secretive nature, they can be difficult partners. In addition, there are traders' cooperatives and associations with whom the project can work.

**Transporters.** While we did not encounter many transporters who were focused on just the rice trade, they are also good points of leverage. The railway, if it could develop a more appropriate pricing scheme for rice, could be a good partner and point of leverage within the rice sub-sector

**Input supply.** Input supply companies are another point of leverage within the sub-sector.

### **Geographic clusters**

As noted earlier, rice producers tend to be clustered into geographic areas that are particularly appropriate for rice production. In Mbeya region, this includes Kyela district, as well as the irrigation schemes in Mbarali and Kapunga. In Morogoro region, it includes Morogoro city, which has a major cluster of mills, Kilombero and Ifakara. In Iringa region, the most important production comes from Pawaga, Idodi and Makete, which appear to have small irrigation schemes.

A number of farmers groups were identified in these clusters, with whom the project could focus its efforts. The team identified 63 farmers' groups in the Igurusi ward and 65 farmers' groups in Chimala ward in Mbeya.

With the liberalisation of the sector, the heavy rice production regions are also now the main points for milling rice, as well as the center of the cluster for input supplies, services providers (such as tractors), and other agricultural machinery. This was clearly witnessed in Mbarali. These also provide opportunities for developing and introducing new financial products through institutions such as National Microfinance Bank (NMB) which has a branch office in the Mbarali region. In addition, there are often community banks and SACCOs, with whom the NMB could interact.

Focusing on improving the infrastructure for roads and utilities in key rice geographic clusters will lead to lower costs. Because Mbarali does not have readily available electricity, it had the highest milling costs of any of the sites visited. In addition, poor roads leading to Mbarali and Ifakara add to the cost of transport. Focused infrastructure programmes in these areas will have wide reaching impacts on the cost of marketing the product.

### **Policies**

Clearly policies related to transport and taxation (cess) play an important role in affecting the price of rice. In addition, policies related to the export and import of rice and the sale of the rice donated by Japan, offer opportunities for opening up the markets.

The fact that the cess differs by district, adds to the arbitrage opportunities for traders. Following the increase in cess in Ifakara, local traders said that there was a noticeable drop in regional trade because of the added cost per bag.

An additional policy issue raised by a number of farmers, which needs to be further examined, is gaining an exemption for tax on diesel fuel used in farming. This is a step taken in many countries.

## **7. CONSTRAINTS AND OPPORTUNITIES**

There are many factors that constrain the growth of the rice sub-sector, but there are also many positive factors that provide opportunities for growth of the sub-sector and strong reasons for the project focusing its activities in the sub-sector.

### **7.1 POSITIVE FACTORS**

- Very concentrated areas of high production potential for small holders in irrigated areas
- Rice/paddy provides high employment opportunities and involves many different cash transactions, stimulating the money multiplier effect in the rural areas.
- There are up to 35 different cash transactions that occur between producing rice and the actual consumption, which means that there are many opportunities for service development and enhancing the production and marketing processes.
- Paddy has a long storage life, which facilitates holding it for better prices as well as providing a nice reserve
- Milling is more profitable than farming
- Within the main geographic clusters, there are many different services available to the small farmer, but are not well coordinated and not always immediately affordable to the farmers.

### **7.2 CONSTRAINTS**

There are many constraints facing MSEs and the growth of the overall sub-sector. Most of the constraints present opportunities to the project, or others, for designing and implementing solutions.

- It was noted that there is weak Dar wholesale market information available at the farm and small town level. This means that farmers often sell at lower prices than they could get, which provides them with a long term disincentive to produce more paddy.
- Rice production is primarily rainfed, smallholder with low productivity. This means that the production is primarily for subsistence purposes and not for cash crop, even though there are many cash transactions.
- Cash flow constraints provide many problems for the small farmers. They are unable to get money when they need it most to pay for different inputs. These cash flow constraints often force them to sell rice at inopportune times, when the price is lowest, and also prevent them from expanding their paddy production. This means that farmers unable to control and maximise their yields, and to better manage the timing of the production, which affects profitability.

- There are many people involved in the marketing chain: farmer, local trader, pieceworkers, millers, regional traders, transporters, brokers, loaders and unloaders, wholesalers, and retailers, with each one taking their piece of the price. This ultimately reduces the price to the producer.
- The price of rice is beyond the control of farmers. However, they are often also not well aware of the prices that are in effect in Dar, so they are not even able to negotiate effectively with the traders.
- Transport mechanism/pricing add extra costs to the marketed price, reducing price to producer.
- Improved alternative means of production are not reaching farmers.
- There is an immediate demand for training in different areas, especially basic business management to help farmers and millers better understand the farm/business cash from their own cash.
- There are few associations, except in irrigated areas.
- Big price fluctuations over the course of the year (on average about 100%), add a lot of risk to the sector and promote speculation, rather than sound production patterns.

### **7.3 IMPLICATIONS AND RECOMMENDED OPTIONS FOR ASSISTANCE**

The analysis demonstrates that there are a number of different places where the project can apply its resources to facilitate the development of private sector solutions to enhancing the growth potential of the sub-sector. The critical point to be made is that private operators should be used to the maximum extent possible to implement the steps to be taken. This runs counter to traditional project thinking where the intervention is provided by the project. This usually leads to unsustainable activities that die after the project ceases. The difficult challenge is to get the private operators to implement the activities because they see the economic/financial benefits in doing so.

The main areas of concentration for the project should be in the following areas:

1. Activities should be focused on the underutilised irrigated areas (either modern, improved, or traditional) with high productive capacity<sup>5</sup>. These areas offer optimal conditions for market led approaches to sub-sector growth:
  - There are concentrated numbers of people, often organised into farmers' groups;
  - Many services are already in place, but pricing is often skewed, and they are often not being used to its full economic benefit;
  - It is much easier to share market information in close areas; and
  - There is lots of scope for improved milling efficiency.

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<sup>5</sup> Irrigated areas under consideration will need to be further analysed for possible environmental impact and ways the project can help address those impacts.

2. A major target of opportunity is the privatisation of the NAFCO farms. The project should remain close to the privatisation process and work closely to enhance the ability of small farmers to take advantage of the infrastructure that will be available by introducing financial products, as well as new varieties of seeds.
3. There is an important opportunity to enhance the availability of market information from the main markets in Dar and other urban areas in the rural areas where the paddy is being sold to the traders. The project focus can be to determine the best way to get this information to the rural areas, whether by radio message or other the press, and develop the systems for reporting the information. Private sponsorship of the information dissemination should be sought.
4. There are a number of inefficiencies in the marketing channels, particularly due to transport pricing stemming from transport practices. Resolving the transport issues will hopefully lead to more efficient marketing of the rice. This will require more in-depth study from the policy unit within PESA.
5. Financial constraints offer important opportunities for the project to liaise with financial institutions such as the NMB, which has an excellent branch network, to develop two new financial products. Both products listed below offer good business opportunities to a commercial financial institution.
  - An important financial product from the farmer's perspective would be a warehouse credit, allowing them to get an immediate credit against their stock, which they could repay once the price rises and they sell their paddy.
  - A second financial product would be specifically for the irrigated areas and concentrate on working capital to meet the larger cash requirements needed to farm larger areas.

In addition to these five major opportunities, there are other areas where the project can apply its resources, though perhaps of less priority. These include:

- Working on developing associations or enhancing management skills of particular MSEs. Good examples would be the mills and irrigated farmers.
- The project's policy component should study the regulatory issues around the cess, its application and collection, to gain a better understanding of the true impact of the cess on the marketing of rice. Similarly, the project should carry out an in-depth analysis of the transport sector in Tanzania to understand the business decisions being applied to transporter behaviour and the impacts of this behaviour on the infrastructure network.
- Investigating opportunities to market Tanzanian rice in neighbouring countries. As transport costs play an important role on the local markets in Zambia and Malawi, Tanzanian rice is already closer than rice coming from Thailand. It should be able to reap increased margins in the countries to the west of Tanzania compared to prices in Dar, which is the point of landing for imports.

Finally, the project should apply economic and competitive criteria to selecting the areas in which it works. In particular, it should avoid carrying out activities in areas where other cash crops are increasing, because they will be fighting economic incentives. An example of this is the Kilombero and other potential growth areas for sugar cane.

## ANNEX I Rice Statistics

### Area Under Paddy in '000' hectares by Region

Region/Year	1994/95*	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Arusha	2	9	9	17.7	7.8	9.8	9.2
Coast/DSM	2.5	23.6	23.3	57.6	39.6	39.1	-
Coast	-	-	-	-	-	-	14.2
Dar es Salaam	-	-	-	-	-	-	2.6
Dodoma	1.5	1.5	1.5	1.4	1.5	1.5	6.6
Iringa	2.5	2.5	2.5	6	3.1	8.2	5.6
Kagera	3.3	1.7	1.5	1.4	1.7	1.7	1.4
Kigoma	0.3	2.9	2.9	3.5	4.3	4.4	1.1
Kilimanjaro	5	6.8	6.8	11.5	9	9.2	6.2
Lindi	12.8	12.2	11.7	10.9	9.9	9.9	5.6
Mara	17.9	0	0.3	1	0.4	0.9	0.8
Mbeya	29.7	51.7	50.5	56.4	51.9	61.7	53.2
Morogoro	57.5	78.3	77.6	48.6	65.7	67.1	37.8
Mtwara	10.4	25.4	25.1	23.8	24.2	24.2	19.3
Mwanza	81.7	64.9	58.3	65.7	53.6	71	34.8
Rukwa	3.1	38.5	36.3	50	29.1	29.1	18.5
Ruvuma	16.1	12.4	12.1	22	13.9	13.9	12.2
Shinyanga	33	73.3	63.1	214	96.6	96.6	53.3
Singida	55.3	52.4	5.9	8.4	6.4	6.4	10.1
Tabora	55.3	52.4	47	33.5	48.2	48.2	21
Tanga	4.1	3.9	3.9	21.2	7	14.1	10
<b>Total</b>	394	513.4	439.3	654.6	473.9	517	323.5

Region/Year	1994/95*	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
area	394	513.4	439.3	654.6	473.9	517	323.5
tonnage	622.6	806.8	549.7	849.2	778.4	782.3	647

**Paddy Production in '000' Tonnes by Region**

<b>Region/Year</b>	<b>1994/95*</b>	<b>1995/96</b>	<b>1996/97</b>	<b>1997/98</b>	<b>1998/99</b>	<b>1999/00</b>	<b>2000/01</b>
Arusha	10.7	11.5	10.9	21.3	12.8	12.2	9.2
Coast/DSM	3.3	23.8	23.8	57.6	49.8	60.2	-
Coast	-	-	-	-	-	-	14.2
Dar es Salaam	-	-	-	-	-	-	2.6
Dodoma	1.6	1.6	1.6	1.4	1.7	0.5	6.6
Iringa	1.4	1.4	1.4	9.5	4	12.6	5.6
Kagera	4.4	1.3	1.1	1.2	1.7	2.6	1.4
Kigoma	0.4	2.7	2.6	3.1	10	8.2	1.1
Kilimanjaro	23.2	19.6	19.7	20.8	26.5	21.4	6.2
Lindi	12.3	14.7	14	10.9	14	15.2	5.6
Mara	12.7	0	0.3	2.9	0.5	1.7	0.8
Mbeya	102.2	162.2	113.9	169.2	175.5	189.8	53.2
Morogoro	78.1	122.6	121.4	126.3	129.5	103.2	37.8
Mtwara	20.3	25.4	25.4	23.8	34.2	26	19.3
Mwanza	121.8	95.5	58.3	164.2	113	109.2	34.8
Rukwa	7.9	52	49.1	90	54.9	67.2	18.5
Ruvuma	26.7	28.3	10.9	33.1	25.8	29.8	12.2
Shinyanga	75.8	82.8	54.8	21.4	39.5	44.6	53.3
Singida	57.3	78.3	5.3	8.4	7.4	2.9	10.1
Tabora	57.3	78.3	31.3	50.2	64.2	44.5	21
Tanga	5.2	4.8	3.9	33.9	13.4	30.5	10
<b>Total</b>	<b>622.6</b>	<b>806.8</b>	<b>549.7</b>	<b>849.2</b>	<b>778.4</b>	<b>782.3</b>	<b>323.5</b>

**PESA Regions**

**Area under Paddy production**

Region/Year	1994/95*	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Iringa	2.5	2.5	2.5	6	3.1	8.2	5.6
Mbeya	29.7	51.7	50.5	56.4	51.9	61.7	53.2
Morogoro	57.5	78.3	77.6	48.6	65.7	67.1	37.8
Rukwa	3.1	38.5	36.3	50	29.1	29.1	18.5
Ruvuma	16.1	12.4	12.1	22	13.9	13.9	12.2
Tanga	4.1	3.9	3.9	21.2	7	14.1	10
<b>Total</b>	<b>113</b>	<b>187.3</b>	<b>182.9</b>	<b>204.2</b>	<b>170.7</b>	<b>194.1</b>	<b>137.3</b>

Percent change p.a.                      66%            -2%            12%            -16%            14%            -29%

**Tonnage produced**

Region/Year	1994/95*	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01
Iringa	1.4	1.4	1.4	9.5	4	12.6	13.44
Mbeya	102.2	162.2	113.9	169.2	175.5	189.8	106.4
Morogoro	78.1	122.6	121.4	126.3	129.5	103.2	98.28
Rukwa	7.9	52	49.1	90	54.9	67.2	37
Ruvuma	26.7	28.3	10.9	33.1	25.8	29.8	17.08
Tanga	5.2	4.8	3.9	33.9	13.4	30.5	16
<b>Total</b>	<b>221.5</b>	<b>371.3</b>	<b>300.6</b>	<b>462</b>	<b>403.1</b>	<b>433.1</b>	<b>288.2</b>

Percent Change p.a.                      68%            -19%            54%            -13%            7%            -33%

## ANNEX II

### MEETINGS HELD IN CONJUNCTION WITH THE RICE FIELD WORK

#### **March 3, 2003 – Dar es Salaam**

Wholesale Market

Small Retail Market

Mohammed Enterprises Tanzania, Ltd.: Dr. N Subbiah

Fida Hussein and Company, Ltd.: Mr. Mushtack Fazal - Director

#### **March 4, 2003 – Dar es Salaam**

Mr. Sagar, Kirlosker (milling machine supplier)

Tanzania Farmers Association, Gibson Kisamba

Strategic Grain Reserve, Albert Ngondo (0744 844 028)

Wholesale Market

#### **March 5, 2003 - Iringa**

Regional Office

District Office

Rice mill (Absentee owner)

#### **March 6, 2003, Iringa, Makambako, Mbeya**

Owner operator of mill in Iringa

Train station in Makambako, Raphael Chawala

Joseph Mpiza, Mbeya Planning Officer

Mohammed Enterprises Tanzania, Ltd. Mr. Vivek Vardham

Mike Frederickson, Enterprise Works

#### **March 7, 2003 – Mbeya - Kyela**

Mohammed Enterprises Tanzania, Ltd., Mr. Chimbi

Mr. Daldo, District Ag officer

Rice farmer (wife)

Small miller

5 rice mills in Kyela

#### **March 8, 2003 – Kapunga, Mbarali**

6 ha rice farmer

Deputy Director, Kapunga Rice Scheme, NAFCO

Group of rice farmers

Tractor owner

Mbarali, Farm Manager, Mbarali Rice Farm # 2. NAFCO

Group of farmers

Mill owners

#### **March 9: Mbeya – Mikumi**

Rice mill in Chimala: Mr. Boniface Vahaye (0744 590821)

Provided information on the team in Arusha (RAMA Mr. Shabani, 0744637787, 0744760748)

**March 10: Kilombero, Ifakara**

Rice mill and 50 acre farmer, AMS Nkuruvi, Box 34 Magula, Morogoro tel: 0748478426

Cotton Gin

Katrin seed breeders, Jacob Mbapila (tel 023-262-5878, fax 023-262-5361, e-mail: mbapila@yahoo.com)

Ag office in Ifakara

Rice mill, Small trader, regional trader

Agro Impex, Mr. Shiraz Karatela

**March 11: Kilombero, Morogoro**

Mkula irrigation association

Rice mill, Ruaha/Kilombero 20,000+ bags per year

Rice mill, Kilombero, not working, but workers earn 6,000 shillings per day

Rice mill, Morogoro

J.I. Mallya, Director of Seed Quality Control, TOSCA

**March 12 - Dar es Salaam**

Auto Sokoni

MRR Trading

NAFCO

**March 13 – Dar es Salaam**

Isaac Mashauri, MD, Tan Seed International, Ltd. (PO Box 140 Njombe), [tanseed@yahoo.com](mailto:tanseed@yahoo.com)

**March 14 – Dar es Salaam**

Presentation to group of 30, representing PESA, National Microfinance Bank, MEDA, USAID, MAFS, Technoserve, Enterprise Works,

## ANNEX III Mbarali Irrigation Schemes

### MBARALI DISTRICT COUNCIL

#### PRIORITIZATION OF MBARALI DISTRICT IRRIGATION SCHEMES FOR NATIONAL IRRIGATION MASTER PLAN: SMALL SCALE IRRIGATION SCHEMES

S/n	Name of scheme	Ward	Village	Source	Status				Area (ha)		Remarks
					<i>improved</i>	<i>traditional</i>	<i>w/right</i>	<i>legal</i>	<i>Potential</i>	<i>Developed</i>	
1	Uturo irrigation cooperation	Mapogoro	Uturo	Kimani River		yes	provision	irr.cooperative	2000	non	Group "A"
2	Gwiri	Ruiwa	Ijumbi	Gwiri River		yes	provision	irr.association	2000	non	Group "A"
3	Isenyela irrigation association	Mapogoro	Mabadaga	Kimani River		yes	provision	irr.association	2000	non	Group "C1"
4	Mbuyuni irrigation association	Mapogoro	Mbuyuni	Kimani River	yes		permanent	irr.association	1500	500	Group "B1"
5	Igomelo	Rujewa	Igomelo	Mbarali River	yes		provision	irr. Cooperative	300	300	Group "B1"
6	Ipatagwa	Mahongole	Ilongo/mahongole/Mhwela	Ipatagwa River	yes		provision	irr.association	800	540	Group "B1"
7	Ruanda Majenje	Igurusi	Majenje	Lwanyo River	yes		provision	irr. Cooperative	1200	371	Group "B1"
8	Mswiswi	Igurusi	Mswiswi	Mswiswi River	yes		permanent	irr. Cooperative	1500	680	Group "B2"
9	Majengo	Igurusi	Mambi	Mambi River	yes		permanent	irr. Cooperative	700	530	Group "B2"
10	Motombaya	Mahongole	Mahongole	Mlowo River	yes		permanent	irr. Cooperative	2600	600	Group "B2"
11	Kapunga small holders	Chimala	Kapunga	Ruaha River	yes		permanent	irr. Cooperative	800	750	Group "B2"
12	Maendeleo	Igurusi	Igurusi	Lunwa River	partially		permanent	irr. Cooperative	2000	400	Group "B2"
13	Mayota	Rujewa	Mayota	Mbarali River	partially		permanent	informal	1000	300	Group "B2"
14	Ibohora	Ubaruku	Ibohora	Mbarali River	yes		permanent	informal	1500	350	Group "B2"
15	Madibira	Madibira	Madibira	Ndembera River	partially		applied for	irr.cooperative	3000	3000	Group "B2"
16	Njombe	Chimala	Muwale	Chimala River	partially		applied for	informal	1000	350	Group "B2"
17	Herman	Chimala	Masasi	Chimala River	partially		applied for	informal	800	400	Group "B2"
18	Igumbilo	Chimala	Igumbilo	Chimala River	partially		applied for	informal	600	300	Group "B2"
19	Chosi	Chimala	Muwale/Mwaluma	Chimala River	partially		applied for	informal	1800	500	Group "B2"

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20	Mahango	Utengule	Mahango Mswiswi	Mswiswi River	partially		provision	informal	2000	270	Group "B2"
21	Mahienga	Mawindi	Manienga	Kioga River		yes	provision	informal	1000	non	Group "C2"
22	Itamba	Mapogoro	Itamba	Mbarali River		yes	applied for	informal	1000	non	Group "C2"
23	Lyanyura	Utengule	Utengule/Maguvano	Mambi River		yes	non	informal	2000	non	Group "C2"
24	Mbalino	Chimala	Itamboleo	Itamboleo River		yes	non	informal		non	Group "C2"
25	Itamboleo	Chimala	Itamboleo	Itamboleo River		yes	non	informal	1800	non	Group "C2"
26	Uhambule	Igurusi	Uhambile	Mambi River		yes	non	informal		non	Group "C2"
27	Chamoto	Igurusi	Chamoto	Mgona River		yes	non	informal	3000	non	Group "C2"
28	Simike	Utengule	Simike	Mswiswi River		yes	non	informal	500	non	Group "C2"
29	Mhwela	Utengule	Mhwela	Mlowo River		yes	non	informal	2000	non	Group "C2"
30	Mwanavala	Ubaruku	Mwanavala	Mbarali River		yes	non	informal	3000	non	Group "C2"
31	Nyeregete	Ubaruku	Nyeregete	Mbarali River		yes	applied for	informal	2000	non	Group "C2"
32	Muungano	Mawindi	Muungano	Kioga River		yes	provision	informal	2000	non	Group "C2"
33	Imalilo	Ubaruku	S/Imalilo	Mbarali River		yes	non	informal	2000	non	Group "C2"
34	Nyangasada	Rujewa	Nyangasada	Kioga/Mbarali river		yes	non	informal	2000	non	Group "C2"
35	Warumba	Ubaruku	Warumba	Mbarali River		yes	non	informal	2000	non	Group "C2"
36	Mapogoro	Madibira	Mapogoro	Dudumizi River		yes	non	informal	2000	non	Group "C2"
37	Nsonyanga/kapyo	Igurusi	Kigowe	Kapyo River		yes	non	informal	1500	non	Group "C2"
38	Ukwavila	Mapogoro	Ukwavila	Ruaha/Kimani River		yes	applied for	informal	1500	non	Group "C2"
39	Isunura	Mawindi	Isunura	Kioga River		yes	non	informal	2000	non	Group "C2"
40	Kanutwa	Rujewa	Kanutwa	Kioga/Kimani River		yes	non	informal	2000	non	Group "C2"
41	Igurusi - Mwanjejele	Igurusi	Igurusi	Lwanyo River		yes	non	informal	1000	non	Group "C2"
42	Mpolo - Meta	Igurusi	Mpolo	Meta River		yes	non	informal	900	non	Group "C2"
43	Mbalino	Chimala	Itamboleo	Itambo/ Meta River		yes	non	informal	2000	non	Group "C2"
44	Kanioga	Rujewa	Kaanioga	Mlomboji/Mbarali River		yes	non	informal	500	non	Group "C2"
45	Mpolo - Itamboleo	Chimala	Itamboleo	Meta River		yes	non	informal	1000	non	Group "C2"

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46	Kongolo Mswiswi	Igurusi	Mswiswi	Mswiswi River		yes	applied for	informal	1000	non	Group "C2"
47	Yoheri	Igurusi	Azimio	Mswiswi River		yes	applied for	informal	1800	non	Group "C2"
48	Utengule	Utengule	Azimio	Mswiswi River		yes	non	informal	1000	non	Group "C2"
	<b>TOTAL (HA)</b>								<b>71,600</b>	<b>10,141</b>	

**KEY:**

Group "A" schemes - studies, survey and design have been done under the RBMSIIP programme

Group "B1" schemes - Improved schemes which needs: Organization strengthening, scheme action plan, and minor rehabilitation

Group "B2" schemes - Improved schemes which needs: Revisiting of constitution, strengthening organization structure, scheme action plan, and intensive rehabilitation

Group "C1" schemes - Traditional schemes which has undergone a number of formal processes.

## ANNEX IV

### African Rice Production Statistics

Table 1: Rough Rice Production (000 t) in Selected countries in Africa, 1975-2001

Year	AFRICA	DRC	Madagascar	Mozambique	Tanzania	Uganda	Others
1975	8,135	208	1,972	101	571	265	16
1976	7,858	213	2,043	45	580	346	29
1977	7,977	214	2,067	68	600	314	21
1978	8,119	213	1,922	52	620	387	26
1979	8,377	227	2,045	70	500	262	15
1980	8,609	234	2,109	75	513	291	17
1981	8,560	245	2,011	78	500	200	15
1982	8,920	251	1,970	80	524	320	19
1983	8,945	271	2,147	82	460	349	22
1984	8,950	286	2,131	84	504	355	20
1985	9,414	312	2,178	86	430	428	19
1986	9,830	315	2,230	93	525	548	21
1987	10,151	330	2,178	90	466	645	20
1988	10,328	350	2,149	93	493	615	23
1989	12,715	370	2,380	95	518	718	45
1990	12,346	392	2,420	96	504	740	54
1991	13,477	394	2,342	56	504	625	61
1992	13,763	403	2,450	33	479	392	68
1993	14,440	430	2,550	66	486	641	74
1994	14,147	426	2,357	101	405	614	77
1995	15,062	366	2,450	113	356	723	77
1996	15,703	348	2,500	139	392	734	82
1997	16,579	322	2,558	180	411	551	80
1998	15,815	363	2,447	191	328	811	90
1999	17,258	350	2,637	186	247	506	95
2000	16,728	338	2,300	151	199	508	108
2001	15,945	326	2,300	167	199	514	108
<b>Total</b>	<b>409,160</b>	<b>10,314</b>	<b>85,295</b>	<b>4,019</b>	<b>18,222</b>	<b>15,490</b>	<b>1,413</b>

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Table 2: Imports of milled rice ('000 t) into selected countries neighboring Tanzania, 1975-2001

Year	Africa	Angola	Comoros	DRC	Congo Rep	Djibouti	Kenya	Madagascar	Mauritius	Mozambique	Reunion	Rwanda	Somalia	South Africa	Tanzania	Uganda	Zimbabwe
1975	733.9	11	10.4	10.4	1.9	3.8	*	57.3	66.9	3	44	2.3	37	87.6	64	5	4.5
1976	1004.8	17.9	12.5	55.1	0.8	9.2	10	62.8	79.2	53	56.9	0.8	20.3	88.8	8.8	2	2.6
1977	1748	35.7	9.6	40	0.1	7.3	-	77.9	65.5	75	42.5	2.9	62.8	110.5	52.1		-7.7
1978	2017	37.1	14	32.1	3.3	10.1	*	126.3	78.5	84.2	53.5	3.6	13.6	103.5	47.2	-	2.8
1979	2426.7	57	23.2	32	8.1	8.5	0.2	180.8	72.4	85	61.4	1.4	13.4	136.9	25.4	10	3.7
1980	2481.9	55.1	12.1	26	3.2	11.3	13.6	72.7	88	84.5	50.7	6.2	61.1	126.1	103.7	15	6.1
1981	2780.7	49.2	30.6	25	5.7	10.9	11.1	192.6	80.4	68.2	47.2	6	75	149.3	45.5	8.8	4.8
1982	3091.2	31.9	24.9	32.5	8.3	24.9	42.4	354.5	78.4	86.5	47.2	4.4	84.2	163.3	126.7	5.2	2.4 3
1983	2947.6	47.3	18.2	32.5	8.9	8.3	43	232.1	72.1	84.5	60.4	4.2	61.3	176.2	63.8	6	19.9
1984	2810.4	54	31.2	37	11	12.9	0.5	138.6	87	72.9	46.2	7.1	94.4	204.2	64	7.5	15.2
1985	3093.1	58	15.9	40	13.4	39.2	0.6	150	83.4	109	73.4	9.7	61.3	193.9	53.2	6	6.0 5
1986	3199.7	47.8	29.5	80	12.5	23	61.7	162.2	64.9	61.8	73.7	9.7	97.4	202.7	141.7	6	5.8
1987	3334.9	86.2	14.9	80	7.5	15.5	39.1	124.6	83.8	83.5	86.6	4.7	81.5	281.9	83.5	6	15.8
1988	2800.5	86	29	70	10.6	21.5	10	37.3	72.3	65.4	55.6	2.7	46.5	253.5	50.4	-	6
1989	3383	35.5	29.2	86.6	8.9	15.1	30	91	90.7	80	50.4	5.2	70	303.1	21	6.1	15
1990	3133.2	98.6	29.9	85	12.3	23.9	28	59	83.1	70	16	4.5	70	306	34	-	11.8
1991	3665.1	100.9	28.1	60.8	24.3	18.2	61.2	23.3	76.1	70	62.5	3.3	90	374.5	60	0.4	8.4
1992	4073	92	32.5	98.3	32.8	16.5	59.6	52.4	64.2	79.5	67.6	3.8	118	362.1	70	0.8	13.4
1993	4040.6	93	30.3	50	25.4	66	37.3	15.4	90.3	76.2	55	3.4	70	385.4	91	2.1	10.8
1994	4029	50	28.5	42.6	30.9	53.5	83.7	79.8	79.5	60.8	63.1	12.5	55	430.6	60	6	25.7
1995	3888.9	31	1.6	70.7	36.7	25.6	27.1	60.2	56.9	90	73.7	7.8	50	466.2	65	3.9 2	9
1996	3666	42.5	30.5	39	18.1	20.4	27.4	20.6	88.6	53.3	-	24.4	88	482.3	52	3.5	16.9
1997	4467.5	24	34.3	55.8	28.1	17.3	62.4	57.8	65.4	44.8	-	25.5	78.3	580.2	98.2	7.6	33
1998	4703.8	39.6	25.9	55.3	36.6	14.7	62.8	58.1	62.4	48.7	-	19.1	151.5	519.6	108.5	53.7	34.1
1999	4758.6	31	30.2	54.6	49.3	24.1	52.6	94.5	83.2	34	-	10.2	61.1	515.2	46.7	39.7	22.2
2000	4519.1	31	23.1	59.5	40.8	20	52.6	94.5	83.2	34	-	10.2	61.1	515.2	46.7	39.7	22.2

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**Table 3: World market price (US\$/t fob) of rice, selected Asian countries 1961-92.**

Year	Government-to-government contract				Private Trade			
	Myanmar, Ngasein, SMS 42%	Thailand white rice, 35%	Thailand white rice, 10%	China PR, 35%	Thailand white rice, 25% super	Thailand cargo rice, 100% B	Thailand brokens, A1 super	Pakistan Basmati
1961	91	92	113	91	...a	126	99	200
1962	93	92	113	91	...	142	113	256
1963	94	99	125	94	...	134	107	...
1964	99	102	128	101	...	124	91	208
1965	102	104	118	101	...	125	96	204
1966	109	124	129	101	139	156	126	208
1967	120	128	149	133	193	221	159	294
1968	146	147	191	158	191	207	152	284
1969	139	128	173	122	160	181	105	250
1970	97	103	126	104	125	144	85	217
1971	77	81	112	83	94	130	67	203
1972	95	96	...	79	104	151	95	232
1973	170	235	274	179	146	383	246	554
1974	335	450	495	362	442	...	363	820
1975	263	269	336	294	312	323	244	659
1976	172	213	...	210	222	254	177	363
1977	203	228	223	197	237	256	183	408
1978	277	321	327	202	329	361	224	724
1979	237	292	308	212	305	336	199	754
1980	317	387	403	245	396	430	254	746
1981	326	402	436	315	434	468	247	727
1982	227	243	262	245	256	280	198	677
1983	205	239	253	221	247	278	194	600
1984	200b	233	247	216	236	254	211	616
1985	174	198	194	172	202	222	171	651
1986	135	180	204	132	185	220	126	714
1987	153	204	226	169	209	238	168	744
1988	...	272	297	261	254	307	232	716
1989	...	291	315	...	296	321	237	684
1990	...	248	282	...	252	286	166	564
1991	...	241	307	...	246	313	189	487
1992	...	231	...	...	...	...	...	...

a... = data not available.

B Starting 1984, relates to Emata 35%.

Sources: 1961-92: FAO. Intergovernmental Group on Rice. Session documents. (various issues)

For Thai 25% and 1984-89 data for Thai 10%, 35%, 100%, and A1 super.

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No recent issues of Intergovernmental Group on Rice Session documents contain updates on these data.

**Table 4: Export prices (US\$/t foba) of rice, wheat, and maize, 1975-2001.**

Year	Rice	Wheat	Maize
1975	363	138	120
1976	254	123	112
1977	272	96	95
1978	368	125	101
1979	334	156	116
1980	434	191	125
1981	483	196	131
1982	293	167	109
1983	277	170	136
1984	252	165	136
1985	216	173	112
1986	211	161	88
1987	230	134	76
1988	301	180	107
1989	320	201	112
1990	287	156	109
1991	313	143	107
1992	287	177	104
1993	270	193	102
1994	268	199	108
1995	321	207	124
1996	339	231	166
1997	303	181	117
1998	304	163	102
1999	248	151	90
2000	202	147	89
2001	173	152	90

a fob = free on board. b 5% brokens, milled, fob Bangkok. c Canadian No.1 Western Red Spring 13.5%, in store Thunder Bay, domestic, from 1985 St. Lawrence export. d US No.2 yellow, fob Gulf ports.

Sources: World Bank. 1984. Commodity trade and price trends, 1983-84; The Johns Hopkins University Press, Baltimore & London; World Bank. 1992. Revision of commodity price forecasts and

**Table 5: Monthly export price (US\$/t free on board) of Thai rice 5% broken, 1975-2001.**

Year	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1975	398	403	396	400	388	352	328	348	358	354	331	307
1976	274	253	248	246	246	242	244	243	266	270	259	258
1977	259	254	261	252	257	264	272	275	275	278	294	324
1978	338	363	396	411	409	404	384	366	369	360	315	294
1979	299	300	314	317	318	324	327	349	360	360	364	379
1980	395	399	415	419	433	442	442	442	442	442	463	470
1981	470	479	505	515	519	535	523	498	490	459	428	383
1982	342	324	325	312	300	292	282	287	270	254	258	265
1983	260	270	282	282	280	269	261	278	299	286	283	271
1984	257	252	254	255	254	256	272	272	254	250	231	224
1985	222	220	221	222	222	222	210	210	210	210	212	220
1986	232	228	215	202	200	205	207	215	207	205	202	195
1987	199	206	212	213	213	212	212	220	251	277	276	269
1988	289	310	303	304	298	301	305	305	305	305	305	289
1989	279	276	285	291	315	334	368	363	350	331	315	315
1990	315	315	302	301	290	278	270	275	271	278	276	275
1991	324	343	337	312	305	309	315	315	315	305	304	294
1992	290	290	290	291	292	294	295	293	287	276	275	276
1993	280	279	266	251	229	227	230	230	234	284	353	370
1994	435	448	423	413	391	345	315	315	305	300	300	300
1995	284	284	286	282	288	326	346	340	360	383	341	342
1996	369	368	360	327	332	342	358	336	328	313	315	319
1997	356	347	323	304	324	323	320	285	271	267	252	270
1998	288	297	296	312	318	326	324	321	321	299	270	278
1999	300	280	256	236	244	254	259	245	229	217	228	234
2000	241	241	226	215	199	196	189	187	179	188	185	184
2001	184	185	175	164	164	168	169	168	173	171	174	179

a Data relate to quoted prices.

b ... = data not available.

Source: 1961-94: Rice Committee Board of Trade of Thailand. Market Report. SGS Far East Limited (various issues).

1995-2001. Source: The Pink Sheet. Development Policy Group. Development Economic Vice Presidency. World Bank.