



RURAL LIVELIHOOD DEVELOPMENT COMPANY

RICE SECTOR STRATEGY

IMPROVING RICE PROFITABILITY
THROUGH INCREASED PRODUCTIVITY AND BETTER MARKETING
FOCUSING ON TANZANIA'S CENTRAL CORRIDOR

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TABLE OF CONTENTS

List of tables	3
List of figures.....	3
Acronyms.....	4
I. SUMMARY.....	5
II. RISE SECTOR ASSESSMENT AND FINDINGS.....	5
1.0. INPUTS.....	7
1.1 PRODUCTION SYSTEM.....	8
1.2 GENDER DIMENSIONS OF RICE PRODUCTION.....	12
1.3 RICE HARVESTING AND POST HARVEST FARMER LEVEL.....	12
1.4 MARKETING OF PADDY.....	13
2.0 MILLING.....	14
2.1 LOCAL MILLER.....	14
2.2 REGIONAL MILLER.....	15
2.3 RICE QUALITIES.....	15
3.0 MARKETING.....	15
3.1 RICE SECTOR MAP.....	16
3.2 PRICES.....	17
3.3 TRADING AND RETAILING.....	17
3.4 CONSUMPTION.....	18
4.0 MARKET SYSTEM.....	19
4.1 SUPPORT FUNCTIONS.....	19
4.2 CORE FUNCTIONS.....	20
4.3 BUSINESS ENVIRONMENT.....	21
4.4 RICE DEVELOPMENT PROJECTS.....	21
5.0 OPPORTUNITIES AND CONSTRAINTS IN THE RICE SECTOR.....	23
5.1 OPPORTUNITIES.....	23
5.2 CONSTRAINTS.....	24
6.0 CONCLUSIONS.....	25
III. SECTOR STRATEGY.....	27
1. VISION -IMPACT.....	27
2. EXPECTED OUTCOMES.....	27
3. PROPOSED STRATEGIC INTERVENTIONS.....	27
3.1 Awareness and Better access of farmers to improved seeds.....	28
3.2 Provision of improved agro skills and farmer’s organisation.....	28

3.3 Innovative marketing and business linkages.....	29
3.4 Networking for synergies and Cooperation with other facilitators.....	29
3.5 Assumptions and Risks.....	30
4.0 PROPOSED PARTNERHIPS.....	30
4.1 Timing.....	31
4.2 Areas of intervention.....	31
4.3 Budget.....	31
4.4 Assumptions and Risks.....	33
ANNEX 1: The Steps of paddy production and costs of production	33
ANNEX 2 Contributors and bibliography.....	34

LIST OF TABLES

Table 1: Rice production trend.....	8
Table 2: Leading paddy production regions Trend.....	9
Table 3: Central Corridor Paddy production.....	9
Table 4: Rice price trend for standard grade.....	15
Table 5: Rice Production and Sufficiency Ratios	17
Table 6: Budget.....	32
Table 7: Cost of production per activity.....	34

LIST OF FIGURES

Figure 1: Rice Sub-sector Map.....	21
Figure 2: Rice Sub-sector Market System.....	22
Figure 3: Proposed partnership.....	26
Figure 4: Rice Seed Market System	Annex 1

ACRONYMS

AKF	Aga Khan Foundation
AS	Ammonium Sulphate
ASA	Agriculture Seed Agency
BMO's	Business Member Organisation
BRELA	Business Registration and Licensing Agency
CAN	Calcium Ammonium Nitrate
CC	Central Corridor (Morogoro, Dodoma, Singida, Manyara, Shinyanga and Tabora.
DAI-PESA	Development Alternative Inc. - Private Enterprise Support Activities
DAP	Di-ammonium Phosphate
JICA	Japan International Cooperation Agency
KATC	Kilimanjaro Agriculture Training Centre
KATRIN	Kilombero Agriculture Training and Research Institute
LGA	Local Government Authority
MAFS	Ministry of Agriculture and Food Security
MATI'S	Ministry Of Agriculture Training Institutes
MITM	Ministry of Industry, Trade and Marketing
MSME's	Micro, Small and Medium Enterprises
NAFCO	National Agriculture & Food Corporation
TOSCI	Tanzania Official Seed Certification Institute
TBS	Tanzania Bureau of Standards
TFDA	Tanzania Food and Drugs Authority
TXD	Tanzania Cross Dakawa
RAA	Regional Agriculture Advisor
REPOA	Research on Poverty Alleviation
RLDC	Rural Livelihood Development Company
RYMV	Rice Yellow Mottle Virus
SACCOS	Savings and Credit Cooperative Societies
SUA	Sokoine University of Agriculture
TSP	Triple Super Phosphate
USDA	United States Department of Agriculture

WRS

Warehouse Receipt System

I. SUMMARY

Rice is the second most important food and commercial crop in Tanzania after maize; it is among the major sources of employment, income and food security for Tanzania farming households. Tanzania is the second largest producer of rice in Southern Africa after Madagascar with production level of 818,000 tones (USDA world rice statistics 2007). The cultivated area is 681,000 ha; this represents 18 % of Tanzania's cultivated land. About 71 % of the rice is grown in Tanzania is produced under rain fed conditions, irrigated land presents 29 % of the total with most of it in small village level traditional irrigations. The average yield is very low, 1-1.5 t per ha. Farmers grow a number of traditional varieties, these varieties have long maturity and yield is affected with irregular rainfall pattern and occurrence of pests which contribute to the yield decline.

In Central Corridor, Rice is extensively produced in the three regions Tabora, Shinyanga and Morogoro where there are more favorable growing conditions. Manyara, Singida and Dodoma have some supplementary production in their low lands. Rice is a particularly important crop in Central Corridor; 48 % of rice cultivated land in Tanzania is found in the CC. According to the team's estimate it involves approximately **230,000 small holder households**. These in turn hire substantial amounts of labor to work in the fields, employ people to move the paddy, they subcontract small mills to mill the paddy into rice (for own consumption) and sell the rest as paddy to local traders. The paddy is usually sold to local agents and traders who transport and sell the rice into regional centers where the bigger millers operate. From there rice is hauled to large urban areas, primarily Dar es Salaam, which is the principal market in the country. In Dar, an intricate network of brokers, wholesalers, middlemen, and retailers ensure that the product gets to the final consumer. Overall, there is considerable cash transactions involved in this entire process, making rice an extremely good crop for stimulating economic activity. It is therefore the crop that touches many lives of the poor households of the central corridor and plays an important role in the food security and economic livelihoods.

Over the past two decades, the functioning of rice subsector has undergone substantial evolution. Formerly, the rice was still milled and marketed by government owned businesses (parastatals). Today the sector is completely privatized following the privatization of National Agricultural and Food Corporation (NAFCO) and National Milling Corporation (NMC) except for government operations in the support services like research, input supply and extension services. The impact of this transition has created more opportunities to private sector, farmers and MSME's at all levels or rice subsector value chains.

From the assessment findings several opportunities are identified that have the potential to change the rice market system; address the assessed constraints and transform the Rice sector for economic growth in the CC.

Proposed RLDC interventions to develop the rice sub-sector market system are foreseen to focus on: -

- Better access of farmers to improved seed varieties to enhance productivity at farmer level
- Developing sustainable mechanism for providing improved agronomic skills and enhance farmer's organization
- Innovative marketing and business linkages with the private sector actors
- Enhancing synergies and cooperation with other actors performing facilitation role in the sub-sector

The impact envisioned is that by the end of 2012 with this rice sector strategy RLDC and its partners have reached 10'000 households in selected districts in at least 2 regions. Their income from rice has increased at least by 15 % over the period.

The team proposes to invest Tsh 500 Mio over two years to achieve the envisioned impact.

II. RICE SECTOR ASSESSMENT AND FINDINGS

1.0 INPUTS

Rice Varieties / Seeds

Tanzania has traditionally grown local varieties of rice which have descended from the seeds originally imported by Arab traders before 1960. These varieties are like Supa, Behenge, Kula na bwana, Kalamata and many others which are well adapted to the climate and the taste preference of the Tanzanians, but they are relatively low yielding, averaging 1 – 1.5 tons per acre. Rice is among few crops that have an enormous number of improved varieties developed and released by the national research institutions. Paradoxically there is no significant use of improved seed by farmers nor are rice seeds distributed by the 15 private seed companies operating in Tanzania today. Hence, most of the seeds planted by majority of farmers are obtained either by using their own seed or by farmer to farmer exchange.

Despite the efforts of research institutions to develop various varieties with more productivity patterns, drought and disease tolerance, there is no strong farmers' demand for them. This has been a major constrain to farm input suppliers to sell these seeds. First and foremost, farmer's awareness of the quality, availability, marketability of produce of these seeds is very low. It is a fact that most of the farmers lack knowledge on the improved seeds hence stick to traditionally preferred varieties with are not economically efficient but have prominent aromatic and palatability characteristics. As rice is self pollinating crop, the quantities of seeds required are not high and continuous which is another reason why agro dealers are not so interested to sell these seeds.

Supply of certified rice seeds from Agricultural Research Institute (ARI) and Agricultural Seed Agency (ASA) is low. Both are engaged in multiplying and distributing improved varieties. ASA in collaboration with the district authorities has an innovative approach to bring the seeds nearer to the farmers and make it more affordable by using agro-dealers and the village dukas. ASA produces "Quality Declared Production System" which are recognized by the TOSCI.

Fertilizers

Common fertilizers used particularly in rice fields range from organic to inorganic. Organic fertilizers are farm yard manure and compost which are found locally and not very widely used. Inorganic fertilizers such as Urea, Triple Super Phosphate (TSP), Di-Ammonium Phosphate (DAP), Ammonium Sulphate (S.A) and Calcium Ammonium Nitrate (CAN) are widely preferred. Fertilizers are mostly imported by the private sector except for Minjingu Rock Phosphate (MRP) which is processed and packed in the country by a private company. The distribution of fertilizers is done by importers and Stockists/agro-dealers who

have low distribution capacities and often put premium prices due to monopoly power and to cover for their transport costs to rural areas, hence the general application of fertilizers is very minimal.

Over the last few years the Government of Tanzania has tried an innovative mechanism to have fertilizer reach the farmers in order to increase fertilizer usage- this mechanism includes subsidizing the farmers for the cost of fertilizer through a voucher scheme. This approach has its ups and downs especially in the rural areas where the cost of transportation and the overall cost for fertilizer are still not economical for the small farmers but could highly benefit large farmers or organized large rice farming schemes.

1.1 PRODUCTION SYSTEMS

1.1.1 National Rice Production

Rice in Tanzania is predominantly dominated by small holders under rain-fed conditions. Historically, rice has been categorized under the staple food crop rather than commercial/cash crop. However, in recent years with the rapid growth of cities and towns propelled by rapid population growth, the country has experienced enormous increase in rice demand. With negligible percentages of rice imports, most of rice demanded and consumed by the urban population is sourced from the rural rice producing areas that have stagnating production capacities. For this reason, rice has consequently been transformed into commercial crop. Due to climatic reasons, most of the wetlands which are major rice producing areas lack alternative food and cash crop making rice the only source of cash and staple food.

The National production for about a decade has had an overall growth although characterized by large fluctuations from year to year.

Table 1: Annual Rice Production Trend (1998-2007)

Year	Area Harvested	Yield (t/ha)	Production(1000t)
1998	209	1.08	530
1990	475	1.8	511
2000	500	1.02	511
2001	530	1.07	569
2002	500	1.29	465
2003	570	1.26	720
2004	650	0.86	556
2005	688	0.83	573
2006	650	1.21	785
2007	665	1.23	818

Source: USDA 2009 World Rice Statistics¹

¹ USDA is a reliable agriculture data source as also used by IRRI specifically as a source for world rice production.
Rice assessment & Draft Sector Strategy 1/19/2011

1.1.2 Production in the Central Corridor

The three regions in the Central Corridor Morogoro, Tabora and Shinyanga have larger areas under paddy; together they have 48,4 % of the total area under rice cultivation in Tanzania. All are favored by agro-climatic conditions offering enough rains for growing paddy.

Table 2: Leading Paddy Production Regions

REGION	AREA UNDER PADDY IN ACRES	PERCENTAGE OF TOTAL AREA UNDER PADDY IN TZ
Morogoro	312,512.7	19.7 %
Shinyanga	293,722.5	18.5 %
Tabora	162,172.8	10.2 %
<i>Mwanza</i>	<i>215,460.6</i>	13.6 %
Mbeya	135,215.2	8.5 %

Source: National Sample Census of Agriculture, Volume II-Crop Sector National Report, 2006

Table 3: Central Corridor Paddy Production trend in recent years in '000' tones

REGION	2002	2003	2004	2005	2006	2007	2008
Shinyanga	203	104.85	130.22	175.22	116.9	186	290
Morogoro	231.6	113	193.44	165.18	226.4	96	348.7
Tabora	161	81.81	103.53	131.91	70.56	83.63	101.1
Manyara	9.1	10	14.6	15.2	12.4	11.7	16.4
Singida	0.9	1.1	1.4	0.216	2.5	3.4	<i>1.5AV</i>
Dodoma	<i>7.3AV</i>	<i>7.3AV</i>	<i>7.3AV</i>	<i>7.3AV</i>	7.3AV	11.4	7.3
Total	605.6	310.76	443.19	487.73	436.06	392.13	764.9

Source: Regional Socio-Economic Profiles and Regional Reports on Agriculture Production

In the central corridor's rice growing regions the types of small producers were identified during the assessment operating according to the production systems (irrigated or rain-fed) and size. Findings are shown below by category;

1.1.3 Farming Systems

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, hire lots of local labor

for services to help during critical periods for planting, weeding, and harvesting/threshing. Also, farmer will hire out his services to neighbors to help them either before or after working his own plots. This is the dominant type of farmer in the country and the regions of the central Tanzania.

Small irrigation farmer – cultivates about one hectare of land of rice in an irrigation scheme often controlled by the irrigation scheme association. Farmer rents the land from the scheme, which provides him with the water paid for each season. The farmer will hire labor as required to meet key functions (ploughing, planting, weeding), and then rent out his services, in turn, to neighbors to earn extra income. There are also scattered small traditional and modern irrigation schemes, such as the 100 acres in Mkula (Kilombero district), 12,350 acres in Wami-Dakawa Mvomero District-Morogoro (formerly NAFCO farms) 6,002 acres in Mwanzugi-Igunga with 630 acres in modern scheme and the rest in traditional schemes, 864.5 hectares in Kintinko –Manyoni District-Singida fed by Bubu river with catchment areas in Manyara region. In total, there are about 192,660 acres of paddy under irrigation schemes. All together, these schemes are farmed on very small plots which however produce only one season in a year due to the irrigation water depending on rains.

Large irrigation farmer – mainly is found in Mbeya region, grows more than 5 hectares of paddy in an irrigation scheme. He out sources all ploughing and mechanized services, which are required to produce on such a large plot, and hires most of the labor 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 intensively. Due to economies of scale, the returns are comparatively higher to the larger farmer, with production reaching 2.31 tons per acre. However, there are greater financial requirements to farm the larger plots.

1.1.4 Farmers Organization

At the grass root level, paddy farmers are in few areas organized in small producer groups with an average number of 20 to 40 members. Unlike in other major cash crops, in paddy there are very few cooperatives, these are mostly based only in the areas with irrigation schemes. Comparatively, production skills and production capacities in irrigation schemes is high. The benefits of collectiveness have been realized and are increasingly favoring them even on the marketing aspects. Rice farmers in groups evidently witness the ease of developing while in groups as compared to individual farmers.

It is also the case for financial schemes and support in relation to highly organized groups seems to be working and easy to establish. MVIWATA and TCCIA have managed to organize, train and connect in networks some paddy farmers in Tabora, Shinyanga and Manyara regions. Through these organizations, Rice assessment & Draft Sector Strategy 1/19/2011

farmers have been trained in group formation and management as well as linked to various opportunities like agricultural trainings offered by various institutions, technological exposure as well as market linkages.

Generally, at the national level there is no forum/platform body that pulls together paddy farmers to deal with matters of common interest and represent them despite the importance of this sub sector. At the same time rice is among the many crops that do not have a crop board therefore its own development hangs in the balance and sub-sector growth is hard to determine.

1.1.5 Availability of Farm Implements & Services

To be able to cultivate easily, farmers especially in paddy fields need to have more simplified, effective and efficient tools. In most of the central corridor farms where farmers are also livestock keepers, the dominating farming equipment are the oxen ploughs and in few instances hired power tillers as well as tractors which are however, too few in the localities hence farmers have to wait for long time before getting the services. This has resulted to some farmers missing the proper ploughing and planting period hence suffering the consequences of weather dynamics.

In few instances, weeding is performed using simple wooden tools (weeder) which are locally made. The tools are said to be adopted from the Japanese farmers as introduced by JICA projects although not highly wide spread among farmers.

Statistically, in CC major rice producing regions; 20 percent of farmers have access to and use the oxen plough either by hiring or of their own. It is only in Morogoro and Manyara region which have respectively 10% and 5% access and usage of tractor services, other areas have negligible percentages. Mechanization of rice production would be thought of as one of the key areas for intervention into transforming rice sector in Tanzania, however, adoption and sustainable use of equipment in Africa will take time. IRRI's² experience in Asia suggests that it would take 8–10 years for the mechanization program to fully develop from initial testing to local ownership and wide-scale adoption. Also the experience of JICA in Kilimanjaro (KATC) shows the transformation to mechanization is faced with a lot of challenges including high costs involved in maintenance and running costs hence they are no longer advocates of it in their project areas.

A description of the different steps of cultivation of rice and the cost can be found in Annex 1.

² IRRI is the International Rice research Institute, based in Philippines. Info from Rice Today Oct-Dec 2009 Newsletter
Rice assessment & Draft Sector Strategy 1/19/2011

1.2 GENDER DIMENSIONS OF RICE PRODUCTION

A majority of Tanzanian farmers are women and make a significant contribution to food production and to the processing and marketing of foodstuffs. They form 60 - 80% of the agricultural labor force in the rural areas. Women play a major role in rice production in the country. They are involved in all aspects of rice value chain particularly planting, weeding, bird scaring, harvesting, processing and trading. It is observed that men are mostly involved in land preparation. Both men and women are engaged in rice harvesting and threshing, while selling the rice is traditionally men's domain.

Generally, the women in agriculture experience excessive workload due to farm work and household chores and difficulty in accessing the key factors of production – land, water, credit, capital and appropriate technologies. It is far easier for men to access these inputs. Therefore monitoring the impact of the strategic interventions will have to consider the gender issues to ensure that gender balance is taken into account and that women are not left out.

1.3 RICE HARVESTING AND POST HARVEST AT FARMER LEVEL

Harvesting and post harvest management is a crucial aspect in rice production as well as in any other crop. Initial processing activities - which involve how to stock, dry and store the paddy - have high impact on the final quality of the produce. Paddy has to be stock piled between harvesting and transporting to households before sun drying. The drying in the stockpile requires a lot of attention, if not well done the moisture content will exceed the required amount and develop rusty cover on rice grain. Common mismanagement at the drying stage is when farmers spread it on sandy surface hence contaminating the paddy with sand and stones. Losses during postharvest are also very high, ranging from 15 to 50%. In some instances, all the grains are lost, contaminated by fungus, particularly mycotoxins, or spoiled by rain after harvest. Farmers lose much of their grain because of poor postharvest management, outdated postharvest technology, and poor and unhygienic storage facilities³. Traditional storage facilities (Vihenge) are commonly used to store household food reserve stock at an average of 300 kgs rather than to store large amounts for marketing purposes in the future. Therefore proper storage facilities for paddy are rarely found in the villages. It is the local miller or the traders and millers further up the value chain that own and manage the large and commercial storage facilities. If the farmers would manage own commercial storage facilities they would be less forced to sell immediately after harvest when prices are lower.

³ **Rice Today** Oct-Dec 2009 (IRRI news letter)
Rice assessment & Draft Sector Strategy 1/19/2011

1.4 MARKETING OF PADDY

Farmers sell their paddy mostly in the village. The buyers are mainly local agents of the local miller. At the same time, for 'home consumption' many farmers bring their paddy to the small local mill where it is dehulled.

The prices for the paddy vary much according to the season, region and the relation the farmer has with his/her buyer. For a bag of paddy with a minimum weight of 90 kgs the farmer gets between 30'000 to 45'000 Tsh. Most of the small farmers are forced to sell at the peak of the season due to lack of storage facilities and therefore can not sell later at the maximum price.

For the farmer who produces 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.

Although paddy has high market value compared with most other cash crops, the return to producers is lower and it is difficult for the farmers to realize its benefits as long as productivity remains low, options and risks to expand production are not taken and constraints of selling and marketing the produce remains untackled.

2.0 MILLING

The mill is the central hub in processing the paddy to rice. Paddy must be milled before the rice can be eaten. Paddy is the unhulled rice from the fields and it remains as paddy until it is milled. At that point it becomes rice. Throughout the document the terms paddy and rice will be used to denote the appropriate stage in the production process up to consumption. Milling involves the de-stoning, de-husking, polishing and finally grading of rice. 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; the price for milling 1 kg of paddy is 30 Tsh. In the process of milling the paddy about 30 percent of the weight is reduced waved out in husks. Commonly used paddy bags contain 90 kgs, which leaves about 63KG net (70%) of milled rice.

Our assessment and evaluation findings conclude that approximately 70 percent of rice produced in rice major producing areas is sold to traders and millers at different levels and 30 percent is consumed domestically.

In essence, millers are the core business men in the rice sector. They are practically the major marketers and absorbers of the entire paddy stocks that leave the households heading for the markets. Usually local agents of traders or millers would collect paddy from farmers in villages and deliver to the mills. Some traders who do not own mills store their paddy stocks in the millers warehouses (for free) until when they are willing to mill for their own arrangement or sell at agreed prices to the miller. Being major actor in the rice value chain, millers have the highest leverage to improve the marketing dynamics of rice.

2.1 LOCAL MILLER

Through out the rice producing area small rice mills are operating. With over 300 millers in the central corridor, the business is largely dominated by small and medium scale enterprises with installed capacity ranging between five (5) tons to twenty (20) tons per day making about 92% percent of all the millers. Although most of the small millers, do not buy and sell paddy rather concentrate in milling business, few of them also buy their own paddy, store, mill, brand, sell to their respective marketing channels. While the owner of the mill usually employs only 2-3 people who manage and maintain the mill, there are usually another 6-7 casual laborers/workers paid on commission who are present to help with the other aspects of the milling. During peak season, the number of casual workers can increase to 20 per mill. 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.

2.2 REGIONAL MILLER

The rest, about 8% millers are large with the installed processing capacity of between 60 and 120 tons per day and are operating for about five (5) months in a year. About 80% of the millers in the paddy producing regions are concentrated in the urban areas, towns and district centers where they receive paddy from local agents and regional traders who collect from farms; rarely farmers sell directly to a regional miller. Taking the case of Shinyanga region, being the second major rice producer in Central Corridor, only 4 millers have their marketing brands labeled on the bags of different sizes.

2.3 RICE QUALITIES

While quality of rice can be determined by the type of seed as well as the mill, the quality of rice is highly determined by the type of mill used. The small local mills which are the majority in the central corridor are using old machinery and technologies which produce lots of broken rice whereas the larger modern mills have less broken rice.

Grading: The grades are defined as *Grade one* with not more than 15 percent broken while *Standard* is between 30 and 50 percent broken grains. Most of the rice sold is not graded and quite often mixed with different origins and varieties. Graded rice is found in some of the stalls and with imported rice.

3.0 MARKETING

3.1 RICE SECTOR MAP

The Rice sub-sector map on next page shows the sector map as observed during the assessment.

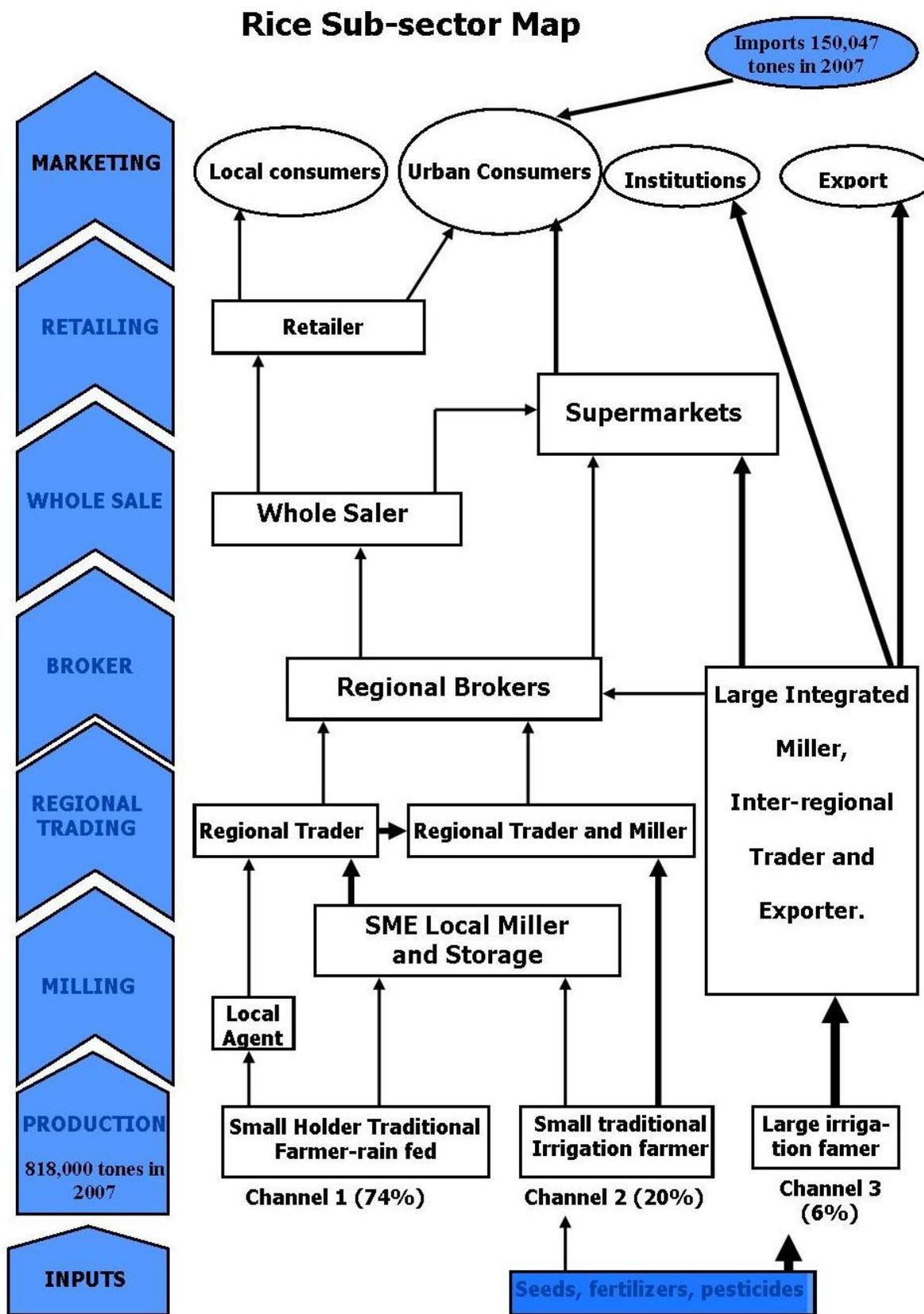


Figure 1: Rice sector map

3.2 PRICES

Through out the year rice is recording big variance in prices which goes up to 50% in all the major markets according to the season. Nevertheless the team findings show that most of the quantity is marketed in high season (between May and July) at lower average price Quote

Table 4: Rice price trend for Standard Grade

Level	High season Price/kg	Low season
Farm Gate *	<i>Tsh 350</i>	<i>Tsh 500</i>
Miller *	<i>Tsh 450</i>	<i>Tsh 700</i>
Regional market **	<i>Tsh 900</i>	<i>Tsh 1100</i>
Retail **	<i>Tsh 1000</i>	<i>Tsh 1400</i>

** The prices indicated at farm gate and Miller level refers to paddy*

*** those of regional market and retail refers to milled rice at market place*

Though the considerable amount of 30 % of rice is consumed primarily on the farms in the rural areas, in absolute terms, the main commercial forces driving the marketing of rice is related to national urban markets, with Dar being the most important market. About 70% of the rice that come from the regional millers is marketed in the major towns like Dar es Salaam, Arusha and Zanzibar.

Paddy or rice transported out of a producing district has to pay a crop levy (Cess) of maximum 5 %. Although export business of rice from Central Corridor to Kenya, Rwanda, Burundi, Uganda and Congo had gained prominence in the last decade, it is has recently declined due to local food shortages and controls as administered by the District Commissioners by the mandate they have to prohibit any food business out of the districts whenever they are convinced that there is potential food crisis. However this control and prohibition of exporting cash-food crops is a major hindrance and limits the opportunities that farmers would otherwise have on prices.

3.3 TRADING AND RETAILING

Traditionally most of the small farmers will sell to local agents of millers or traders. This marketing channel includes the greatest number of actors (growers, traders, and millers) and provides the largest amount of rice into the markets. There are lots of long term relations of trust and dependence between seller and buyer and it is relatively difficult to penetrate this channel on the village level

Some of the better organized and more dynamic smaller farmers (representing less than 20 %), producing on less than 10 acres of irrigated land with their higher yields and nearer to regional centers have established direct links with regional buyers.

Only 6 % are the integrated miller/trader ventures linking to bigger farmers on irrigated land with modern agronomic practice can link directly to national large millers and buyer; some of them are linked or integrated to larger trading companies which are dealers in other crops (maize, cotton, a.o.) and to also import 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.

3.4 CONSUMPTION

Demand and supply

The demand and supply situation of the rice market in Tanzania shows that there is high demand that can not be sufficiently supplied by the local production; varying from a self sufficiency of over 80 % in good years, where as in bad years only about two third of the consumption is produced in the country and the rest has been supplied by the imports.

Table 5: Production and Sufficiency Ratios

Year	Production (1000t)	Self Sufficiency ratio	Total consumption	Per-capita consumption
1998	530	82.3	644	20.5
1999	511	67.1		23.6
2000	511	67.1		23
2001	569	76.5		22
2002	645	76.3	845	24.4
2003	720	78.3		26
2004	556	69		22.3
2005	573	76.6		20.3
2006	785	81.8		25.6
2007	818	84.5	968	25.4

Source: USDA 2009 World Rice Statistics and Graphics

The above table shows that despite the production having gone up by 54 %, while the total consumption increased by 50 %, there is still a gap of some 150'000 tons of rice in an average year only being filled with imported rice.

3.4.1 Consumer Segments

Rural households: Although the team could not have concrete 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 paddy producers. Depending on the location of the household, the farmers will mill the rice before consumption or will husk it using traditional methods (mortar and pestle). Rural households consume some 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 on the urban household, whether in regional towns or in Dar and Arusha. 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 fast growth rate of urban population (e.g 4.7%- Dar) offers a good market opportunity for rice farmers.

4.0 RICE MARKET SYSTEM

4.1 SUPPORT FUNCTIONS

The government has invested in the rice research, training as well as extension services. KATRIN in Kilombero, Dakawa in Mvomero, SUA as well as the MATI's in Mkindo and Ilonga- Morogoro play key role in research of new rice varieties and training farmers respectively. The extension service network in all the regions, districts as well as in some wards and villages is a close technical support to rice farmers although there are severe shortages. Statistics show that there are 3,379 agriculture extension officers while the established demand is over 15,000.

On the side of financial services the situation is even worse. Farmers are not credit worth and most of the productive areas are far distant from the service providers. With respect to financial service, the SACCOS established by farmers are the major sources of the financial services although most are faced with the structural problems and operational hick ups.

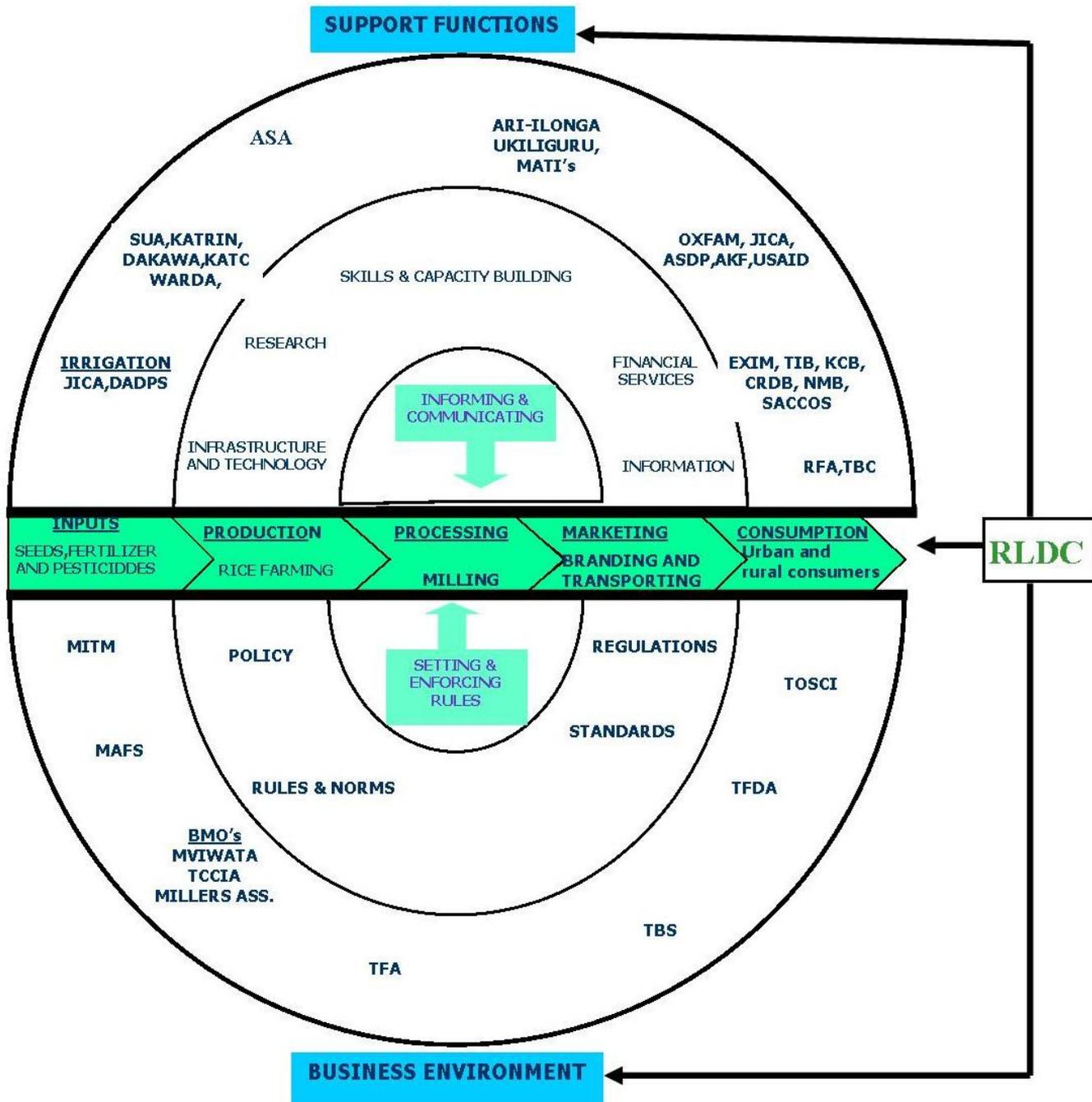


Figure 2: Rice Sub-sector Market system

4.2 CORE FUNCTIONS

Despite the efforts of the research institutions to develop various varieties with more productive pattern, awareness of the quality availability and marketability of these seeds is still very low. ARI, ASA are key players in supplying both certified and foundation seeds to farmers. TANSEED International, a private seed company is also embarking in rice seed business starting this season. The seeds are distributed to

farmers through district authorities, agro dealers or stockiest. For this year ASA has multiplied 400 tons of different varieties of certified seeds of rice ready for being distributed to farmers. About 230,000 HH are producing rice in the CC, in 2007 CC production was 392,000 tons.

There are over 300 millers in cc of which 92% is dominated by small and medium scale ranging between 5-20 tons per day the remain 8% are large millers with capacity between 60-120 tons per day. 80% of the millers are concentrated in towns, urban area and district centers with only 4 millers in Shinyanga; Musoma Food Co, Bunda Rice mills, Nyanguge rice and Jambo oil mills having their own marketing brands labeled on the different sized bags. About 70% of the rice come from the regional miller is marketed either as a wholesale or as a retail bases by traders or local agent in up markets like Dare s salaam, Arusha and Zanzibar. The price ranged between 1000 -1400 Tsh per kg. from high to low season.

In 2007 the total consumption in Tanzania was 968,000 tons; 84.5% were produced in the country while 15.5% which was 150,047 tones were supplied by the imports such as Madagascar, Thailand, Japan and India.

4.3 BUSINESS ENVIRONMENT

Before liberalization of the sector, rice was extensively produced and marketed by NAFCO as well as National Milling Corporation on the part of processing the rice. Recently all these activities are privatized including the relevant infrastructures like the irrigation schemes, farms, mills and their storage facilities. 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 bylaw against food sales out of the district in times of food shortages. There is also WRS act partly regulates rice sector on the marketing aspect.

At a minimal role (or more), Important regulatory authorities are TBS, TFDA, Tanzania Business Registrations Licensing Agency (BRELA), Occupational Safety and Health Authority and LGA. MITM issues operating licenses to rice processing industries and trade licenses to rice traders. Licensing for food branding from TFDA and TBS takes long time and costs about Tshs.400,000/= per each license.

Other policy issues that pose difficulty in rice sub sector efficient functioning are; Government policies declaring rice as staple food crop rather than cash crop hence limiting its commercialization. Also the trade officers in districts are under the MITM, where as the production is under MAFC with no consistent policies matching the two closely related aspects.

4.4 RICE DEVELOPMENT PROJECTS

4.4.1 National Rice Development Strategy

The Government through Ministry of Agriculture and Food Security has finalized in May 2008 the draft of National Rice Development Strategy. The vision of NRDS is to transform the existing subsistence-dominated rice sub-sector progressively into commercially and viable production system. General objective is to double rice production by 2018.

If NRDS is successfully implemented it would increase the national food security and enhance income generation at household level through production of sufficient quantity and quality rice. NRDS targets in its implementation eight identified strategic areas:

- i) Improving seed systems and fertilizer distribution;
- ii) Developing improved varieties, production and integrated crop management options;
- iii) Post-harvest and marketing of rice;
- iv) Improving irrigation and water harvesting technology;
- v) Enhancing access to and maintenance of agric. equipment;
- vi) Improving capacity for technology development, training and dissemination systems;
- vii) Access to credit/agricultural finance; and
- viii) Promotion of medium and large scale processing industry

4.4.2 Development Partners in Rice sub-sector

There are efforts by several development agencies and NGO's that want to improve the condition of rice sector in Tanzania. Among all, JICA has been persistently supporting Tanzania rice sector for about 3 decades. Apart from supporting the establishment and running of KATC in Kilimanjaro in late 1980's, JICA is currently committed to supporting agro skill development in irrigated rice. With 40 irrigation schemes all over the country, JICA supports training of core/lead farmers by sending them to KATC for two weeks. After training, the lead farmers are obliged to train other farmers in their respective village/schemes as well as practice what they are trained in demonstration plots. Also JICA has placed four rice experts in MATI's (Ukiliguru, Mkindo, Ifakara) and at ARI-KATRIN for technical support. JICA is also keen to address gender issues in rice cultivation the leading development organization in the rice sector. Towards, improved seeds availability, JICA is working to test and certify the use of NERICA⁴ rice

⁴ NERICA variety is higher yielding (3.5stones/ha), early maturing (30-50 days), resistant to local stresses. In Tanzania it is not yet released but it is under evaluation and testing pioneered by JICA. No much RLDC can do until it is released for use by farmers

variety that is doing well in other countries as well as in Zanzibar where it has been officially released after successful field testing.

Oxfam GB has embarked in 2009 into rice sector development program in Shinyanga. They are working in 30 villages in Kahama and Bukombe Districts under the Tanzania Agriculture Scale Up (TASU) program. The targeted outreach is 6000 HH where incomes shall increase through increased productivity. The specific objectives of the program are mobilization for SACCOS and Savings & Internal Lending Communities (SILCs), train and support self supporting producer groups to build producers knowledge, skills, confidence, and team work so that farmers assist themselves in to innovate, form processing companies. Further, Oxfam works on improvements through in expensive technology, better on soil and water efficiency, encourage value addition, learning and sharing with others through FFS, exchange visits and forums. Oxfam adopts a value chain approach and cooperates with private sector service providers and partners to implement the project. It also encourages beneficiaries' contributions; no direct funding is provided to beneficiary community.

Aga Khan Foundation (AGK) designed a rice development project in the Lindi region and is in the final stages of preparation. AGK is adopting M4P approach in their projects and will start the activities within this season. We have established contacts on sharing the assessment findings and the interventions they will implement.

USAID has presented a program called 'Food Security Implementation Plan' focusing on Morogoro, Dodoma, Manyara/Arusha which includes amongst a lot others interventions in rice. It is proposed to improve the irrigation schemes (Dakawa, Kilombero) and enhance in cooperation with IITA the multiplication and dissemination of improved rice varieties e.g. Nerica. The program has a total budget of ar. 20 Mio US\$ and is supposed to start in 2010.

The World Bank under a program of strengthening agricultural productivity and growth in the East African regions has approved US \$ 30 million for Tanzania. "*The program will support Tanzania to establish a Regional Center of Excellence for Rice, aimed at improving rice production through better access for farmers to improved varieties, management practices and post-harvest technologies ..*"⁵

⁵ Quote John Murray McIntire, World Bank Country Director for Tanzania, Uganda and Burundi.
Rice assessment & Draft Sector Strategy 1/19/2011

5.0 OPPORTUNITIES AND CONSTRAINTS IN THE RICE SECTOR

5.1 OPPORTUNITIES

- Existence of improved seed varieties with higher productivity, tolerance to diseases and water efficiency. Also private seed companies those are ready to invest in multiplication and distribution of improved rice seeds.
- Rice is among the crop that will be given priority in the national agenda for agriculture (KILIMO KWANZA).
- Available advice from rice research institutions with trainers and required skills. In the country there are three rice research and breeding centers in Morogoro and one rice training centre in Kilimanjaro. International research on rice is much advanced.
- High market value of rice with ever increasing price. Large unsatisfied domestic market demand. The urban market is always faced by seasonal rice shortages leading to price hikes every year. The urban population (Dar) has 4.3% growth rate per annum offering more market for rice.
- Unused processing capacities of integrated and small milling plants with ability to mill more rice at the high quality and grade according to the needs of the market.
- Political will of the Government to enhance production and productivity of rice as seen through Government effort on establishing a National Rice Development Strategy.
- Suitable policy environment such as exemption of taxes on agricultural inputs e.g. machinery, fertilizers, and subsidy on agricultural inputs such as fertilizers, improved seeds and pesticides.
- Farmer's willingness to form or join small farmers' groups at village levels with some connected to a network of farmer groups (MVIWATA) at regional levels.
- Existence of some large irrigation schemes both traditional and modern where growth potentials are high with farmers more organized and receptive to agriculture market development programs.
- Willingness of development partners to support and the sector development. (JICA, AKF, Oxfam, USAID).
- World Bank's support into making Tanzania centre for Rice excellence.

5.2 CONSTRAINTS

At a glance, the rice sub sector seems to be functioning well, but with a deeper assessment and analysis the sub sector is faced with a number of both structural and operational constraints hindering realization of its outspoken potentials in productivity and quality. The team has identified some major constraints as herewith presented:

- Lack of availability and limited knowledge on improved seeds with higher productivity. Not much effort has been made to disseminate improved seed varieties to the farmers even though a lot of improved seed varieties exist.
- Farmers lack knowledge and skills on better agronomic practice and post harvest management. They are adopting new better practices very slowly.
- Where irrigation schemes exist the water management is mostly poor.
- Lack of direct business relationship between farmers and the processors/millers who are key actors in rice marketing. Marketing is still very much linked to traditional relationships with local agents and brokers.
- Most of the farmers are dealing individually with the existing problem; there are only few farmers' organizations to be found in the sector and mostly limited to small production groups of 20-40 members at the village level. Further up there is a no collective representation of rice producers both at regional and national levels.
- Farmers do not have access to financial services due to distance to banks, lack of appropriate financial products for farmers and missing microfinance institutions near to the farmers.
- Limited reliable commercial storage facilities especially close to farmers' production areas. All the warehouses used are owned by millers and are located in town/urban centers. Farmers only have their traditional storage facilities with limited capacities and cleanliness.
- Lack relevant market information (price, quality, market areas of high demand, transport costs)

6.0 CONCLUSIONS

The following conclusions can be drawn from the assessment findings in the Rice sub sector within the Central Corridor:

- Use the demand pull - The rice market is mostly demand driven. The demand of rice is not met by the local production which leads to importation of rice so as to fill the supply demand gap. There is a supply gap which opens opportunities for farmers
- Increase productivity - The rice production area constitutes 18% of the total land under cultivation in the country. The best use of this area is not achieved due to limited use of improved seeds as well as fertilizer. At the same time, access to machinery and other farm implements such as tractors which are currently very low.
- Employment - the sub sector employs a lot of Tanzanians at different stages of production and value addition. This is seen all the way from planting, weeding, harvesting, threshing, transportation, milling and packing. In the CC alone 123'000 HH depend directly from rice; including all stage of the rice value chain they are many more.
- Women involvement - Rice seem to be among the leading sub-sectors that offer large opportunity for women to be involved in and contribute economically to the income of the household through production and trading.
- Rice sub-sector brings together different development partners who are interested and therefore offers a good opportunity to put into a practice a market facilitation approach by devolving with the other initiatives to enhance synergies and complementarities and to share investment costs in the sub sector with other actors within the market system.
- There is room for cooperation and synergy with on-going government efforts in research and subsidies on fertilizers as well as removal of taxes on tractors meant for farming. At the same time, almost all the large irrigation schemes in the country have been constructed by the Government or with Government funding.
- There are several areas to improve in the market system; at production level, given the large number of farmers involved in this sector, gives opportunity for RLDC to organise the farmers into economic groups for better production, joint access to financial access and capital. More so organised farmers will allow for access to production knowledge through agronomic skills, post harvest handling and marketing of paddy.

III. SECTOR STRATEGY

In order to address the identified constraints and fully capitalize on the opportunities in the rice market system, the RLDC's rice team has designed and is proposing the following strategy so as to improve the functioning of the rice sector in the central corridor by end of 2012. The interventions shall in the first year be in testing stage and will be replicated in other areas upon successful testing results

1. VISION - IMPACT

By end of 2012 the strategy has reached in the Central Corridor at least 10'000 (*or approx 5 % of all*) rice farming households in selected districts in at least 2 regions. Their income through rice production has increased at least by 25 % in two years through better productivity and improved marketing.

2. EXPECTED OUTCOMES

- Productivity in rice cultivation has increased 20 % over the two years
- Rice farmers have better access to improved seeds and are using them
- Improved rice specific extension services are available for advice and training
- The rice farmers are adopting modern agronomic skills
- Rice farmers adopt better post harvest management practice
- New business linkages between millers / traders and rice farmers are established. Innovative arrangements for better supply chain linkage (contract farming, grouped sales, a.o.) have been introduced and tested
- Farmer's organization is strengthened; producer marketing groups and their leadership have been formed and trained
- Cooperation and networking amongst the development partners active in the rice sector is enhanced

3. PROPOSED STRATEGIC INTERVENTIONS

The sector team proposes four lines of intervention:

- 1. Awareness and access of farmers to improved rice seeds**
- 2. Provision of improved agronomic skills and enhancement farmer's organization**
- 3. Innovative marketing and business linkages with private sector market actors**
- 4. Networking for synergies and cooperation with other facilitators**

At this stage the proposed interventions and activities can be detailed as follows.

3.1 Awareness and better access of farmers to improved seeds *(Component 1)*

Agricultural Seed Agency (ASA) has established a seed distribution network coupled with trainings to regional/district agro dealers with the intention to bring a reliable and efficient seeds distribution nearer to farmers. ASA and its business development service providers train and coach agro dealers in seeds distribution business management in cooperation with the district extension services. The seeds are distributed in the village through known village agro shops.

RLDC shall seek collaboration with ASA to facilitate the rice seed distribution in the villages of three districts in two regions.(Mwanzugi- Igunga Tabora, Magugu- Babati, Kintinko- Manyoni)

The following activities are planned:

- Discuss with ASA the possible terms of collaboration to support and improve seed distribution system in selected districts on the village level
- Support trainings of agro dealers in seed technology and handling, pricing and marketing
- Seek for collaboration and agree with district authorities on supporting the intervention
- Facilitate establishment of demonstration plots on rice seed varieties by agro dealers to enhance improved seed awareness and demand at village level.
- Facilitate seed fair day to distinguish seeds and encourage farmer's use of improved seeds
- Seek for and contract service provider to train agro dealers in business management, record keeping and book keeping.

3.2 Provision of improved agronomic skills and enhancement farmer's organization *(Component 2)*

MVIWATA (potential partner) has an established network and relationships with rice farmers and farmer groups in the target areas. The basic idea of collaboration with MVIWATA is to select and possibly link groups in selected districts with the planned activities of the other components. Main objectives are the

farmers' training in agro skills through district extension services or third party service providers to enhance farmers' knowledge and practice in order to improve productivity. And secondly to form and strengthen groups. In the component 2 specific attention will be paid to the gender aspects involved in the production. Specific activities shall involve the following:

- Discuss and agree with MVIWATA conditions of possible collaboration in implementation of the rice strategy
- Draft model for cooperation with district authority, agro dealers and rice research institutes for training of farmers in modern agronomic practice with low cost efficient technologies and the establishment of rice farm field schools.
- Integrate gender issues in the trainings
- Facilitate exchange visits and study tours
- Mobilize and train farmers in group formation and leadership.
- Facilitate formation of constitution and registration of farmer groups.
- Coach and support farmer groups in sustainable business activities (input supply, group selling)

3.3 Innovative marketing and business linkages *(Component 3)*

Regional millers play today the major role in marketing rice. For their supply they depend on their network of local agents and traders in buying the paddy. Generally speaking there is a supply gap; the millers could sell more rice if they dispose of more sources for their paddy supply. The team will investigate deeper into the opportunities to improve their supply by linking organized farmers with bigger buyers and expanding their sources for reliable supply of paddy. Innovative arrangements such as contract farming, group selling can be proposed if their requirements in quantity, quality and price are met by farmers and their marketing groups. If components 1 and 2 are well implemented these links can be enhanced.

Proposed activities

- Discuss opportunities for innovative supply arrangements with selected millers
- Organize stakeholder meeting
- Facilitate linkage of miller and farmers
- Enhance market price information delivery system

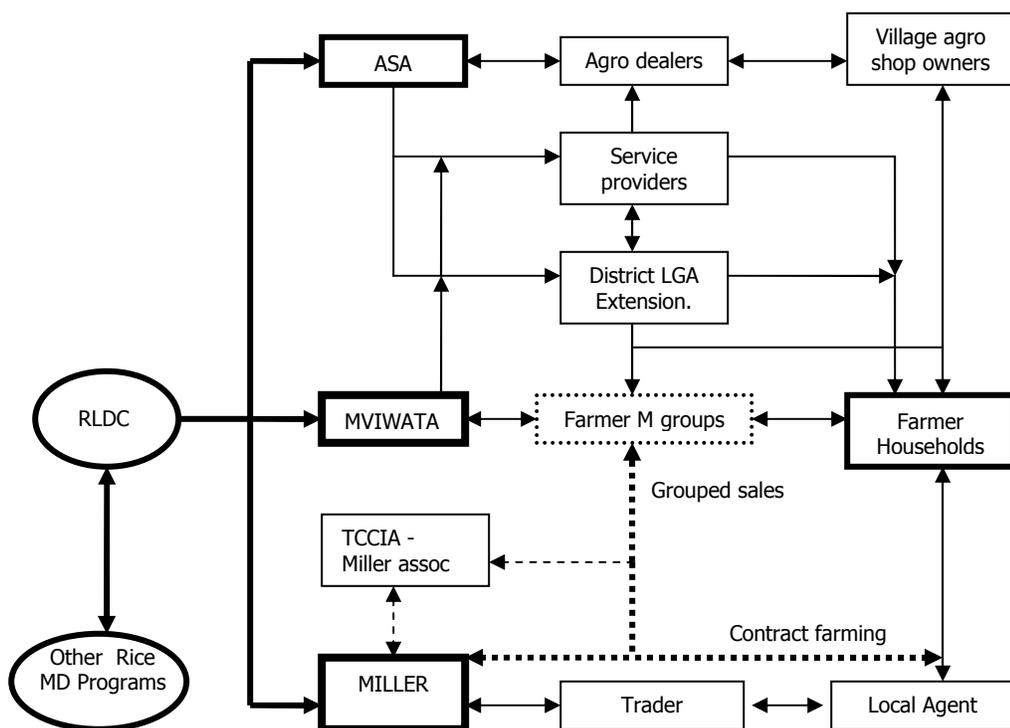
3.4 Networking for synergies and cooperation with other facilitators (component 4)

Oxfam has started its rice project in Shinyanga, while a larger rice project of Aga Khan Foundation is about to start in Lindi region. Equally JICA is continuing its efforts in the rice sector. RLDC shall

approach these organizations to find out which options for collaboration and exchange of information exchange exist with these rice sector development initiatives. The main aspect here will also include agreeing on who does what and where so as to avoid duplication but rather to efficiently use the resources available.

The intervention components are interconnected and designed as an integral concept where the different interventions are supporting each other and contributing to the overall result. As an example the trainings in component 2 are carried out in areas where the accessibility of improved seeds has been assured and where demonstration plots are in place. The inter linkages can be seen in the partnership scheme further down. There is also a logical sequence of timing the interventions as it can be see in the time plan.

4.0 PROPOSED PARTNERSHIPS



As the above scheme shows the proposed interventions are interlinked and involving the partners on different level but contributing to the ultimate scope of improvements in productivity and marketing as mentioned under the chapter. Assessment of potential partners for the proposed intervention is on going.

4.1 Timing

The implementation of the rice strategy, shall take the pace of the major component according to the convenient timing of the specific activity and the relevance/priority. Ideally, the project shall be as in the below table.

Time/component	Dec-Mch'10	Aprl-Jne'10	Jly-Nov '10	Dec-mch'11	Apr-Jne'11	Jly-Nov'11	Dec-Mch'12	Apr-Jly'12
Awareness & access to improved rice seeds	Blue	Blue		Blue		Blue	Blue	
Agro-skills and farmers organization	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Marketing and business linkages with private sector		Green	Green	Green	Green	Green	Green	Green
Networking and cooperation with other facilitators	Red	Red	Red	Red	Red	Red	Red	Red

4.2 Areas of interventions

The team proposes to select 3 to 5 districts in 2 to 3 regions of the CC. Selection of the districts with potential will be done with the respective partners and in view of bundling the components in order to increase impact. Potential areas in the CC are:

- Manyara: Babati
- Tabora: Igunga, Nzega, Uyui
- Morogoro: Dakawa, Kilombero
- Singida: Kintinko

4.3 BUDGET

It is proposed that for the next 2 years Tsh **500 Mio** should be set apart for the rice sector development. It is estimated that the expenditures would be slightly higher for the 2009/10 season (= estimated 300 Mio Tsh) and in the following 2010/11 season would amount to approximate 200 Mio Tsh. The components 1 to 3 should approx. 90 %, for the networking the remaining 10% should be enough.

The specific intervention budgets for each component will be determined during direct negotiations with partners and responding to opportunities that will negate the constraints. However indicative budgets are seen in table 6.

Table 6: Budget for rice sector development

Strategic Intervention	2009/10	2010/11	Total
○ Better seed access (component 1)	125	50	175
○ Agronomic skills & farmer organization (component 2)	100	75	175
○ Marketing & business linkage (component 3)	50	50	100
○ Cooperation with rice facilitators (component 4)	25	25	50
Total for 2 years	300	200	500

4.4 Assumptions and Risks

In putting this strategy into action and achieve the desired outcomes there are a number of assumptions and conditions which are conceived in planning the implementation. In case these assumptions hold otherwise there potential risks that may be faced. The following are the assumptions:-

- There economic and market situation shall not change.
- There is reliable source of certified seeds (ASA).
- Policy environment in favor of agriculture (KILIMO KWANZA) holds.
- Good climatic conditions persist.
- Farmers will be receptive and collaborative to the project.

In case the assumptions do not hold the risks that are possible to be faced are

- Falling of price of price hence the fall of the targeted profitability increase
- If the weather/rains become severely bad the productivity will be affected.

If ASA fails to supply the certified seeds to the agro dealers the issue of access to improved seeds will also fail.

ANNEX 1: The steps of paddy production and costs of production

Analyzing 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 labor carries out the steps listed below. The prices quoted, however, represent the total cost and therefore assume that the farmer was not contributing labor.

- First step is ploughing, done either by oxen, tractor or hoe. The cost for the ploughing is generally between 30,000 and 35,000 /= per acre. Many farmers have their own animals and will rent them out to neighbors, 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 cost for this activity is 20,000/=. Sometimes, fertilizer will be applied at time of planting; commonly used fertilizer is UREA with a cost range 30,000/= - 40,000/= per bag.

Commonly, Seed is kept from the harvest of the previous year. Few farmers interviewed actually purchased their paddy seed which costs about 30,000 for local varieties and 80,000/= for improved varieties. In irrigated rice production, some farmers plant a nursery and then transplant the seedlings a month later in determined spacing which costs 50,000/=.

- Fourth is weeding. This is done by hand and is very labor intensive and expensive. The cost is between 20,000/= and 25,000/= per acre, as well. Once the field is weeded, the main application of fertilizer (UREA) 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. This is basically the case in Morogoro unlike in western regions of Central Corridor.
- 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 35,000 and 50,000 /= 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 90 kg of paddy, though this can decline to 70 kg depending on the dryness of paddy.
- 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 7: Cost of production per activity

Input/Activity	Cost/acre	Quantity(acres)	Total
Farm preparation	20,000	5	100,000
Nursery preparation	50,000	Lump sum	50,000
Ploughing	30,000	5	150,000
Harrowing	35,000	5	150,000
Seeds			
Fertilizer	35,000	3 bags	105,000
Planting	20,000	5	100,000
Weeding	25,000	5	125,000
Bird scaring	50,000	Lump sum	50,000
Harvesting	50,000	5	250,000
Transporting to home	40,000	lump sum	40,000
Total			1,120,000/=
Income/bag	35,000	10*5	1,750,000/=
Net profit			630,000/=

- Average yield per acre is approximated 10 bags.
- Average acreage is comparatively approximated at 5 acres.

ANNEX 2: Contributors & Bibliography

This sector assessment report is an extract and contribution of various publications and stakeholders relevant to rice market system. Herewith is the list of these sources of information that has enriched this report

List of Contributors

Name of person	Title	Organization	Region
Mr. H. Tusekelege	Rice breeder	Dakawa Agr. Research Center	Morogoro
Prf. C. Rweyemamu	Head of Dept	Crop Science- SUA	Morogoro
Ms. Marcelina	Regional Coordinator	TCCIA	Shinyanga
Mr. S.Y. Salawa		MVIWATA Igunga	Tabora
Mr. Chamatata	Agr. Advisor	Regional Office	Shinyanga
Mr. Batigasha	Trade officer	District Office	Bariadi
Mr. Kija mabula	Owner	Nyaguge Mills	Bariadi
Mr. Said	Managing Director	Musoma Foods Co. Ltd	Shinyanga
	Manager	Bundaa Rice Mills	Kahama
Mr. Khamis Mazao	Chairman/miller	Kahama Rice millers Association	kahama
	Agr. Advisor	District Office	Kahama
Mr. C. Lufundisha	Trade officer	District office	kahama
Mr. Lugendo Msegu	Programme Officer	Intermon oxfam	Morogoro
Mr. Isaka Mashauri	Managing Director	Tanseed International	Morogoro
Mr. Francis Massawe	TASU program manager	Oxfam GB	Shinyanga
	Trade officer	Igunga District Council	Shinyanga
Mr. Abraham	Regional Agr. Advisor	Dodoma Regional Office	Dodoma
	Regional Agr. Advisor	Manyara Regional Office	Manyara
Mr. Otieno	Regional Agr. Advisor	Tabora Regional Office	Tabora
Mr. Kawamala	Marketing Manager	Agricultural Seed Agency	Morogoro

4.2 **Bibliography**

- Agricultural Seed Agency, Ministry of Agriculture and Food Security And Cooperatives, Morogoro Tanzania
- Development Alternatives Inc (2003) Rice subsector Study on Private Enterprises Support Activities Project Tanzania by Ebony Consulting International (PTY) Ltd
- Jerry A. Ngairo, Abiud L. Kaswamila and Catherine J. Senkoro, (2007) Rice Production in the Maswa District, Tanzania and its contribution to Poverty Alleviation, Research on Poverty Alleviation, Report no 07.1
- JICA Research Institute 2009, JICA's approach to Rice Development in Africa, presentation to the 2nd Card General Meeting
- JICA annual Report 2007, Current state of Development, chapter 3 Africa
- KATRIN Ifakara Tanzania, Kilimo cha Mpunga Kituo cha Utafiti wa Kilimo, toleo 2008-L3
- Ministry of Agriculture, Food Security and Cooperatives: (May 2009), *National Rice Development Strategy*, Final Draft
- Mwangaza and Kalalu, (2004), Proposal for Full Release of Two New Rice Cultivars presented at the Variety Release and Sees Certification Committee Meeting, New Arusha Hotel, Sokoine University of Agriculture Crop Science Department Tanzania
- OXFAM GB 2008 Rice for Local and Export Markets Subsector and Value Chain Analysis, study by Match maker Associates Limited Final Report
- International Rice research Institute July – September 2009, Rice Today; Making Rice less Thirst Overcoming the Toughest Stress; vol 8, no 3
- International Rice Research Institute, October- December 2009, Rice today; Mechanical Self Sufficiency