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Industry Mapping Rice Sector

The road to a competitive rice industry in Rwanda

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Management Summary

Rice is one of the major staple crops in Rwanda. In Rwanda, rice is cultivated mainly in the marshlands over an area of 6,838ha. With 5.8mt/ha of on-farm productivity, rice yields in Rwanda exceed the average level of productivity of several other traditional rice growing countries. However, the local production in Rwanda lags behind the consumption needs of the national market. Currently, the domestic production is able to provide only 70.5% of the national annual requirement of 60,825mt.

Despite of efforts by MINICOM, RSSP and others, the rice sector remains a fragmented and poorly regulated business. The unique cooperative structure of the rice sector is not functioning properly because of poor cooperative management, lack of post-harvest handling and storage facilities and lack of integration with the industrial rice mills. Cash traders are abusing the weak situation of cooperatives by offering farmers and cooperatives cash deals at competitive prices. Subsequently, they convert the paddy into rice via tolling arrangements with small mills and sell the rice in the local market. Needless to say that the resulting rice quality is poor.

Field research has shown that of the 70,000mt of paddy produced by farmers, some 35% is either lost after harvest, used for seeds or consumed at home. Of the remaining 50,000 only 17,000 did end-up with the industrial mills and over 42,000mt went into the grey market.

The consequences of the paddy leakages are grave. The average capacity utilization of the industrial mills is some 34% if the full 50,000mt would have been available for industrial mills. However, with 17,000mt of paddy, the real average capacity utilization was only 12% which is clearly unsustainable.

Most of the rice processors expressed they had problems with the paddy purchased from cooperatives and traders. The low quality is decreasing their milling yields and according to the millers this is mainly caused by the low quality of seeds, lack of fertilizer use, and absence of proper infrastructure to dry, pre-clean and store paddy after harvest.

The consumers have a preference for imported white rice from Pakistan, Vietnam and Tanzania. They have the opinion that the locally processed rice is from a lower quality. The industrial mills put a lot of effort in processing and marketing a good quality of locally processed white rice. Unfortunately there is a negative influence from traders, some small millers, and wholesalers who don't care about putting quality rice in the market. Evidence is there that sometimes grade III was sold as Grade I, qualities were mixed, and inferior rice was put in second hand bags of the well-respected industrial mills.

All the industrial mills are trying to sign contracts with the cooperatives. However, it appears that in reality some cooperatives are violating those contracts. According to the management of the cooperatives they are forced by the members to sell at the highest price possible and that's why they sign contract with all mills and deliver to the mill offering the highest price or even to traders passing by. The managers expressed that if they stick to the originally signed contracts the

members will not deliver the paddy to the cooperative but directly to the paddy traders.

Although the challenges are clearly significant at all levels of the value chain there is clear scope for improvement. Interventions should be focused on bringing down the post-harvest losses of 35% to more sustainable levels and decreasing the market share of the cash traders. In particular, the following interventions are necessary:

1. Cooperative capacity building

Poor cooperative management is one of the key factors undermining the success of the rice sector. Therefore cooperative management and Boards should be trained in the economic principles of good cooperative management. Also cooperatives should be more consistent in issuing penalties for defaulting members. In theory, both Fucorirwa and RCA should play an active role in this but they lack capacity.

2. Cooperative investments in post-harvest handling and storage

Cooperatives need to invest in central drying floors and collection points. This will not only decrease losses but also help the coops to monitor the paddy flow and avoid side selling. Unfortunately, only few cooperatives are qualified for investment loans because they are either too small or too weak. Therefore, support from USAID and other sponsors should be mobilised.

3. Cooperative consolidation

One of the key bottlenecks in the sector is lack of economies of scale at all levels causing high production cost. The government should actively promote consolidation of cooperatives and Unions. This will create economies of scale and decrease current inefficiencies. Especially, weak and small cooperatives could benefit from integrating in stronger cooperatives with stronger management. Larger cooperatives will find it easier to arrange financing from banks for investments and working capital. The current 2-tier structure with Unions is not perfect because it creates an extra layer of bureaucracy. Ideally, the coops should merge with the Union into a large 1-tier cooperative with top-down management. The challenge is to keep the "localised" cooperative corporate governance structure intact to avoid disconnection with the members. This can be achieved by installing local advisory committees with voting power in the general assembly. The structure of Banque Populaire du Rwanda can be taken as example. Please refer to Chapter 8 for a detailed action plan.

4. Cooperative partnerships with processors

Consolidation will also make it easier for cooperatives to integrate forward into milling. Due to the current overcapacity it should be avoided that cooperatives build new mills (only when there is a compelling business case). Rather we would like to see cooperatives taking a minority share in existing mills preferably in a partnership with an industrial party (e.g. ICM). Dividends can be used in the first 5 years to repay any loan used by the cooperative to acquire the share. As soon as possible (part of the) dividend should be paid to the members to optimise loyalty of the members to the mill.

5. Eradicating the cash traders

Creating stronger cooperatives and a better integration with mills via the aforementioned steps will already make it harder for cash traders to get hold of the paddy from members. But on top of this,

RBS & MINICOM should increase its efforts to eradicate cash paddy traders and micro mills. As long as these traders buy > 60% of available paddy the industry will remain weak and suffer from serious underutilization. It should be a policy that paddy trading is only allowed for cooperatives.

6. Mills and RAB should cooperate more closely

Solving quality problems has to start with using the right seed varieties. In this respect, it is crucial that millers and RAB will work closer together to discuss quality issues and develop varieties that have a high milling yield, are preferred by Rwandese consumers and produce a high yield.

7. Stronger policing by RBS & MINICOM of traders, millers, wholesalers and retail

It is clear that MINICOM & RBS have a prominent role to play in the rationalisation of the sector.

BPR, being the main agri bank of Rwanda, is committed to increase its financing activities in the rice sector at all levels of the value chain. However, given the current problems and risks in the rice sector, BPR's financing volumes in rice are not reaching its full potential. The aforementioned interventions are necessary to arrest the current issues and to create a the required conditions for banks to operate.

1. Introduction

According to the RSSP out of the 47,000mt of rice produced in 2011 only 50% was collected through rice cooperatives and of the 50% only 21% was processed and sold as good quality milled rice. This means that from the 47,000mt only some 5,000mt of rice was produced by the industrial mills as quality rice and the rest as low quality rice (although this figure is probably too low it is clear that this poses a serious risk to the industry).

This causes a strong over-capacity of the mills in the country and as a result a high cost basis. The high cost basis is exacerbated by the relatively high paddy prices paid to the farmers when compared to international paddy prices in for instance Vietnam. As a consequence, Rwandese rice has a low quality image and is only consumed up-country. In the cities, people are buying imported rice from Tanzania, Vietnam, India or Pakistan.

The Ministry of Trade & Commerce (MINICOM) is actively trying to streamline the rice milling sector by introducing new policies on rice mills, registering traders and protecting the local rice market against rice dumping from abroad. Although these policies have had a certain impact still much has to be done to improve the image of Rwandese rice and improve the capacity utilisation of industrial mills.

RD has carried out two missions to Rwanda to map the key issues in the industry and to discuss possible solutions with key stakeholders in the sector (incl MINICOM). Improving the structure of the rice sector is imperative to the successful implementation of BPRs financing plans in the rice sector.

In the first mission, the focus was on the cooperative structure of the rice sector and how to reach economies of scale and a higher level of professionalization. The second mission was aimed to map the rice milling capacity in Rwanda versus the paddy production potential in three key districts (East, West and South).

This report describes the outcome of these missions, our observations and recommendations for improvement. It should provide guidance to MINICOM and other stakeholders to solve current problems. It also provides BPR with market information that can be used as basis for its financing strategy.

2. Supply & Demand

2.1. History

Since the introduction of rice for cultivation in 1960s, rice has become one of the major food crops grown in Rwanda. The fertile soil, favourable weather, natural water resources, and efficient manpower make Rwanda highly suitable for rice cultivation. Furthermore, owing to the advantages of rice grains such as long shelf-life, ease of cooking and transportation, and less requirement of cooking fuel (compared to traditional food such as potato), rice has become a popular choice of food in schools, homes, restaurants, and public programs in Rwanda. The rising incomes, growing urban population, and changing lifestyles have further aggravated the demand for rice.

In response to this growing trend, Government of Rwanda has identified rice as a priority crop since 2002. Subsequently the Ministry of Agriculture and Animal Resources has invested tremendous amount of resources into the development of rice sub-sector in the country. As a result, the total domestic rice production increased strongly in the last decade (see table below).

Year	Cultivation area (Ha)	Yield (t/Ha)	Production (Paddy, t)	Production (Milled Rice, t)
2000	3,549	3.4	11,925	7,751
2001	7,100	3.5	24,851	16,153
2002	7,844	4.1	31,769	20,650
2003	8,877	4.6	41,011	26,657
2004	9,708	5.1	49,942	32,462
2005	11,610	4.8	55,881	36,323
2006	12,025	4.3	51,958	33,773
2007	11,224	4.5	50,223	32,645
2008	12,000	5.5	66,000	42,900
2009	14,000	5.8	81,200	52,780
2010	12,186	5.8	70,680	45,942

However the demand for consumption has also been surging during these years. The local markets responded to the increase in demand mainly by importing milled rice grains (Table. 2) from countries such as Tanzania, Pakistan, Vietnam, and Uganda. Rwanda, in accordance with its EAC membership, currently administers a tariff free rice imports from EAC countries and imposes a common external tariff for rice imported from outside EAC. The leading rice stores in urban areas largely sell the imported rice grains, whereas the stores in rural areas and in other unorganized markets sell predominantly the locally produced rice grains.

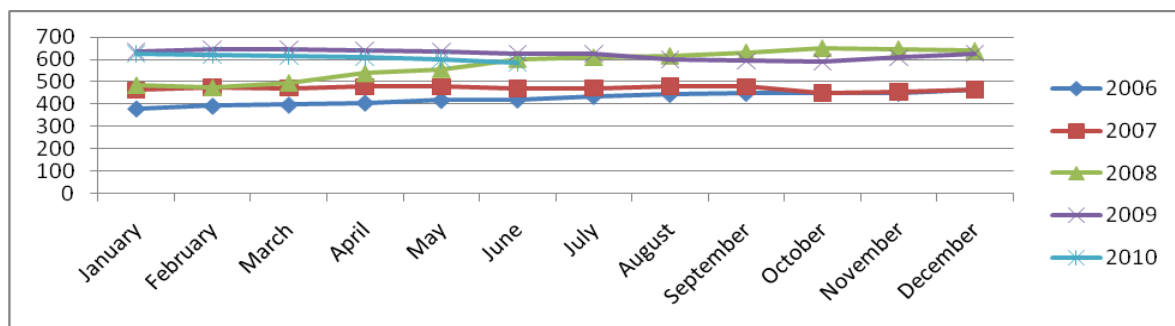
Year	Consumption	Production	Importations
2001	44,030	16,151	27,879
2002	34,665	20,650	14,015
2003	38,777	26,657	12,120
2004	45,742	32,462	13,280
2005	47,910	36,323	11,587
2006	50,435	33,773	16,662
2007	55,532	32,645	22,887
2008	60,825	42,900	17,925
2009	84,440	52,780	31,660
2010	90,487	45,942	44,545

2.2. Prices

It appears that during the last four years (2006-2010), the price of rice on the market in Kigali rose from 400 to over 600 RWF per kg. This increase in the price level is mainly due to climate change and drought in 2009 resulting in a significant decrease in production in 2010.

Due to the perceived quality difference, a kilo of locally produced rice costs between RWF 650-700 while imported rice is priced at around RWF 900/kg.

Graph 1: Changes in rice prices from 2006 to 2010.



Source: MINAGRI

The above chart shows that the long-term trend of the rice price is upwards. At the same time, the price volatility during the season is limited.

2.3. Projections

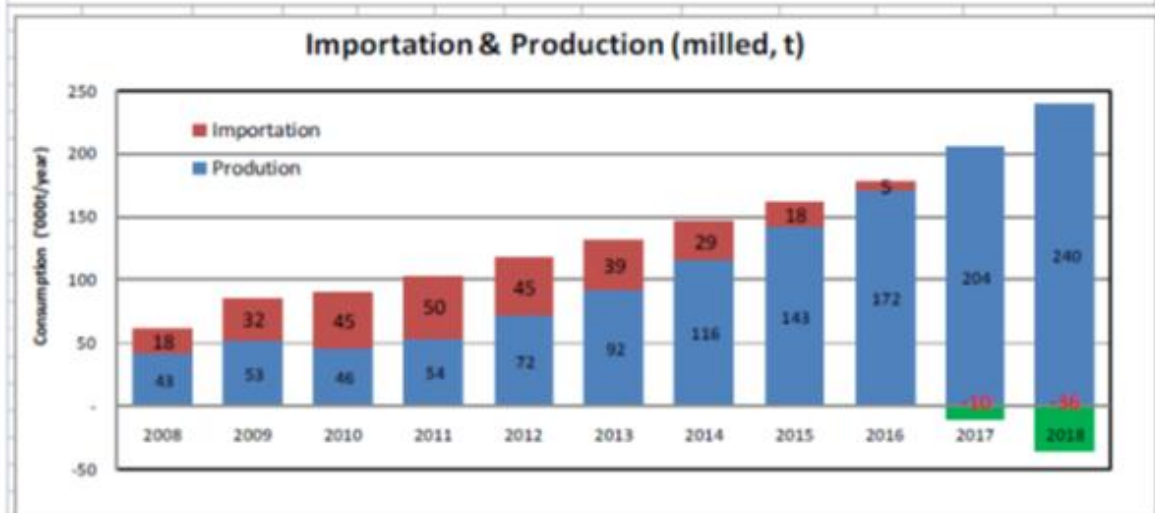
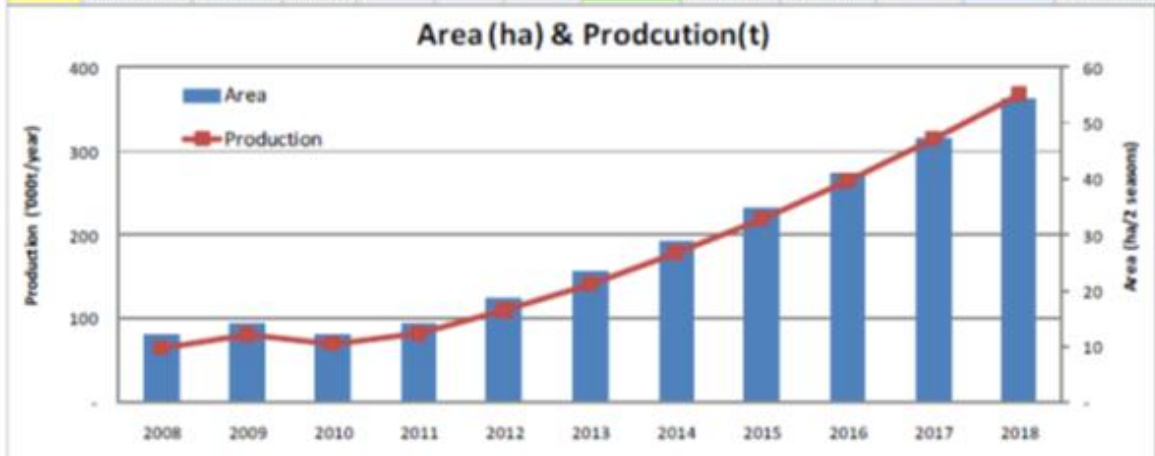
Reclaim 2,500ha of physical cultivation area / year												
	Area (ha)			Yield*2 (t/ha)		Production (t)		Import*2 (milled, t)	Consumption (t)		Population *3 ('000)	
	IR		RF-low	Total	IR	RF-low	Paddy*2		milled*2	milled		/person
	Physical*1	Total*2										
2008		12,000		12,000	5.5		66,000	42,900	17,925	60,825	6.2	9,832
2009		14,000		14,000	5.8		81,200	52,780	31,660	84,440	8.3	10,117
2010	6,838	12,186		12,186	5.8		70,680	45,942	44,545	90,487	8.7	10,413
2011	8,500	14,245		14,245	5.8		82,621	53,704	49,523	103,227	9.6	10,718
2012	11,000	18,700		18,700	5.9		110,330	71,715	44,932	116,647	10.6	11,033
2013	13,500	23,625		23,625	6.0		141,750	92,138	38,614	130,752	11.5	11,356
2014	16,000	28,800		28,800	6.2		178,560	116,064	29,488	145,552	12.5	11,686
2015	18,500	34,225	500	34,725	6.4	1.0	219,540	142,701	18,353	161,054	13.4	12,022
2016	21,000	39,900	1,000	40,900	6.6	1.5	264,840	172,146	5,143	177,289	14.3	12,365
2017	23,500	45,825	1,500	47,325	6.8	2.0	314,610	204,497	-10,251	194,246	15.3	12,713
2018	26,000	52,000	2,500	54,500	7.0	2.0	369,000	239,850	-35,740	204,110	15.6	13,084

*1 Data in 2010 = Season 2010B Cultivation area

*2 Info source (2001 to 2011): RADA / Rice Development Unit

*3 Info source: P19, Medium scenario, NATIONAL POPULATION PROJECTION 2007-2022 (NISR, 2009)

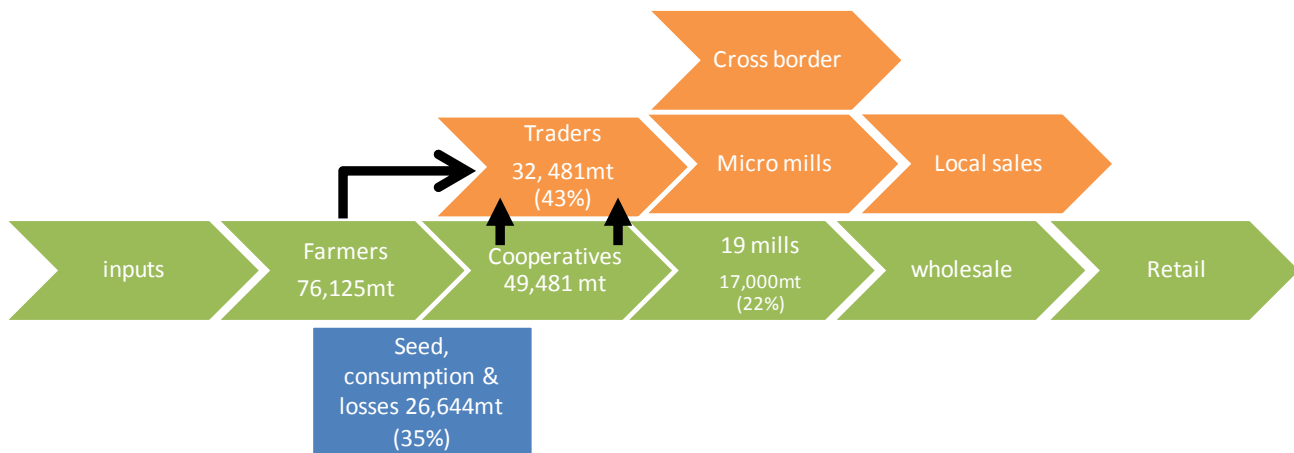
Baseline data of Rwandan NRDS Medium & Final Target Estimation



The tables above provides projections of key supply and demand indicators for Rwanda as well as the projected imports (Source: MINAGRI). The following observations can be made:

1. The area of irrigated rice lands is projected to show strong growth until 2018. Between 2011 and 2018 the total area is projected to almost quadruple from 14,245ha to 52,000ha (based on 2 crop cycles p.a.)
2. Yields are projected to gradually increase from 5.8mt/ha to 7mt/ha in 2018
3. Total paddy production is projected to increase from some 82,000mt in 2011 (= some 54,000mt milled rice equivalent) to 369,000mt paddy in 2018 (some 240,000mt milled rice equivalent).
4. Imports are projected to decrease from some 50,000mt milled rice in 2011 to zero in 2016/2017.
5. Consumption of milled rice is projected to almost double from some 103,000mt in 2011 to 204,000mt in 2018 fueled by increased consumption per capita and population growth.
6. The theoretic technical capacity of the big mills in Rwanda of 175,000mt (= 36.6mt/hr current capacity + 7.2mt/hr new capacity, assuming 2 shifts per day) will be fully utilized in 2014 assuming that the produced paddy is fully milled by the big mills.
7. However, assuming that in reality less than 50% of the paddy is milled by the "big" mills, the capacity of 175,000mt will only be utilized by 2018 (with a total projected paddy production of 369,000mt)

3. Value chain analysis



Source: field research Rabo Development in 3 districts, 19 mills

Note: milling capacity is based on 2 shifts (80hours/week), 50 weeks per year

3.1. Seeds

The quality problems in rice start with the seed supply. There is a lack of high quality long-grain seeds and many farmers use farm-saved seeds. In addition to seeds, there are issues with availability of fertilisers and chemicals (despite the efforts of organisations such as RAB and PAPSTA). Another issue is that most mills do not work with the Research Institutions such as RAB to improve seed varieties.

3.2. Rice farming

Rice farms in Rwanda are very small with an average plot of land of less than 0.1ha. As a result, mechanization is not feasible and production cost of rice in Rwanda are relatively high. According to RSSP, average cost of production is estimated to be some 170 Rwf/kg (USDc 28/kg). This compares to production cost of rice in Vietnam of USDc16/kg (i.e. more than 40% cheaper than Rwanda).

It is also interesting to compare paddy prices paid at farm gate:

Vietnam (2011): 24USDc/kg

Rwanda (2011): 41USDc/kg

Tanzania (2009): +/- USD 30c

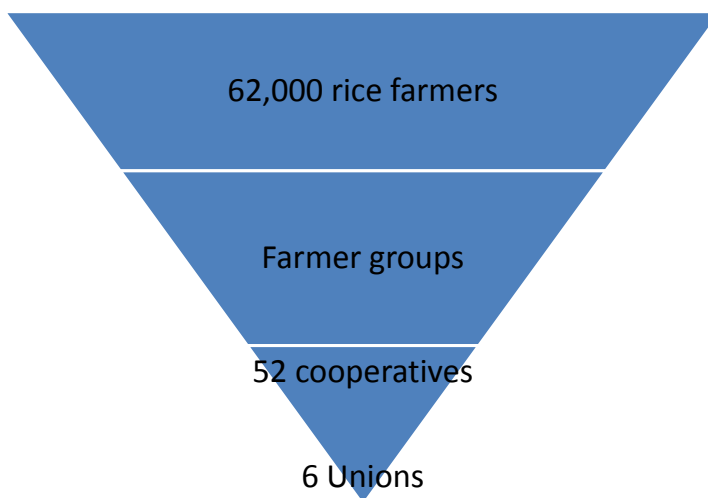
One way to bring down production cost is to create economies of scale by pooling land of farmers and introduce mechanized harvesting (this is the trend in Vietnam). This will also reduce post-harvest losses. Another way is to introduce higher yielding varieties and intensify the use of fertilizers. This will increase the productivity and hence will bring down average cost per kg paddy.

3.3. Post-harvest handling and storage

Due to a lack of post-harvest handling and storage facilities, a large portion of the paddy is sun-dried by farmers affecting the quality of the paddy and the milling yield. Central drying floors, cleaning and storage would improve the quality of paddy and rice and lead to a higher efficiency in the chain. Unfortunately, only few cooperatives have the means to invest in post-harvest handling facilities. Organisations such as USAID and RSSP are supporting investments in post-harvest handling but there is still ample room for improvement.

3.4. Cooperative system

The Rwandese rice growers are organized as follows:



As aforementioned, there is still ample scope for improving the quality and efficiency of paddy and rice in the value chain. As long as the process remains inefficient and mills are suffering from over-capacity, the cost price of rice will be too high and side selling will continue.

Part of the problems in the sector can be attributed to the way the cooperative sector is organized. We believe that the sector is still too fragmented and lacks economies of scale. It seems that the split between cooperatives and the Union creates an unnecessary management layer, with delayed payments, small cooperatives and a sometimes incoherent strategy.

An example is the UCORIBU Union. This Union comprises 10 cooperatives and represents some 18,000 members in three districts. The delivery record is 65-75% which is too low. The articles of association mention a 100% delivery obligation but this is not enforced.

UCORIBU has requested financing for investments in post-harvest handling at cooperative level (drying floors & storage). Maybe 5 out of 10 qualify for a loan but the other 5 don't. As a result, 5 cooperatives will probably be refrained from good post-harvest infrastructure and not be able to improve the quality of the paddy. This means that some 50% of the total supply of UCORIBU potentially remains of a poor quality.

There should be an active government policy to promote merging of cooperatives to create economies of scale and improve efficiencies. In the case of UCORIBU, the weak cooperatives should be allowed to merge into the stronger cooperatives to create synergies. The best management should lead the new larger cooperative.

A process of gradual consolidation should be stimulated until the moment the UCORIBU union becomes a 1-tier organization. A 1-tier organization will allow a more centralized business planning, optimization of post-harvest handling and logistics (transport) and a strong central management team. Also banks may find it more interesting to deal with one large organization as compared to 10 small cooperatives.

Whereas the business is lead centrally (top-down) the governance can still be kept locally (bottom-up). For example, the current local cooperative boards can be replaced by local advisory committees (elected by the local members). The local advisory committees can send their representatives to the Central Assembly to vote on the major strategic issues.

It is important that this consolidation process is started but it is even more important not to hurry it. Communication to the cooperative members is key as the members should fully comprehend and support any restructuring of the cooperative and/or Union. As long as the members understand that the new structure will result in cost savings that will be translated into higher prices for paddy (or a faster pay-out) the members will probably support any restructuring of the business.

3.5. Mills structure

Over the last 20 years the industry has been dominated by numerous small farmer operated rice mills producing inferior quality rice. That is to say that typically it will contain dust and stones in the product. Many of these farmer-mills have been taken over by traders who then finance the farmers, who are normally short of capital and contract them at typically low prices to grow the grain.

With the advent of this situation a number of issues have arisen.

- The traders have no interest in investing in the industry at either the farmer or co-op level and as a consequence there has been practically no development in new and better seed varieties or appropriate fertilizers.
- Because the co-ops are circumvented in this situation they receive no margin from the trader or farmer and are therefore starved of capital and have no money to maintain the irrigation systems under their control, hence there has been a steady decline in productivity on the existing irrigated fields.
- As all transactions by the traders are in cash the Government has received little or nothing in the way of tax receipts from the industry and there have been substantial debts run up by the cash-starved co-ops.

Currently the traders are supposed to be licensed and those that are arrange for the co-ops, with mills operating within the policy, to "toll process" the paddy. The trader then pays the co-op directly, again typically in cash, and sells it on the wholesale market. Because the traders invest

nothing in the co-ops in the way of agronomy, because they are paying cash and along with the mislabelling of bags, they continue to undermine the industry at both ends of the rice chain.

One of the major policy directions to farmers and co-ops more recently has been the requirement to only sell their rice through a registered mill as defined in the Policy document. This is working only to a limited extent as the Government /RBS has limited resources to enforce such a policy.

Paddy leakages

The rice value chain in Rwanda is hampered by significant leakage of paddy to the informal market. This is generally attributed to the following main reasons:

1. Side selling by farmers and cooperatives to traders & micro mills (instead of supplying to their own cooperative or Union).
2. Home consumption of paddy by farmers
3. Farm saved seeds (i.e. farmers keeping part of the paddy for seed)
4. Post-harvest losses due to poor drying, handling and storage facilities
5. Cross border trade to Burundi and other countries.

Total paddy (mt)	76.125	→	19 Big mills	17.000	22%
		→	Traders/micro mills	32.481	43%
		→	Losses, seeds etc	26.644	35%

Sources: field research by Rabo Development, see Chapter 4 for details

It is not entirely clear to what extent these factors contribute to the leakage. In general it is assumed that post-harvest losses, seeds and home consumption account together for some 35% of paddy production. But the side selling of farmers to traders and micro mills poses even a bigger problem with some 43% of all paddy which is exacerbated by:

- Lack of integration between mills and coops
- poor cooperative management
- links between cooperative leaders and micro mills
- slow payment by cooperatives
- lack of liquidity at cooperatives
- no enforcement of penalties to defaulting farmers and
- lack of positive incentives to deliver good quality paddy to cooperatives

To increase the flow of paddy to the licensed mills the government has implemented the following policies:

1. Increasing the production of paddy by:
 - a. Reclamation of marshlands (i.e. increase of irrigated acreage),
 - b. Yield increase by improving the quality and quantity of agri inputs (seeds, fertilisers and chemicals)
2. Capacity building to cooperatives under the RSSP
3. Investing in post-harvest handling under RSSP
4. Licensing mills that meet the technical and management criteria (by RBS)
5. Closing down micro mills (RBS)

Although these policies certainly have had an impact the government lacks enforcing power to solve the problems structurally.

Please refer to Chapter 4 for a detailed analysis of the problems in the milling industry in Rwanda.

4. Marketing of Rwandese rice

As mentioned in the National Rice Development Strategy, rice produced in Rwanda has not a good image and is largely sold in unorganized rural markets, whereas the mainstream urban markets largely sell imported rice. This is mainly because low quality Rwandese rice is mixed with higher quality rice from other mills and bags are mislabeled. As a result, the average quality of Rwandese rice is mediocre. Quality of rice can be improved through mechanized drying and storage, adequate supervision and/or regulation of milling operations. In addition, improved post-harvest handling also contributes to a higher quality end-product.

The acceptance of rice quality is generally determined by the consumers based on physical and cooking characteristics. Consumers in mainstream markets in Rwanda generally prefer the long and medium/slender types of rice grains.

Strong processors generally should create their own brands:

- Good quality (at least grade 2)
- Good package, incl small packaging for retail
- Traceability
- 2 brands: one mainstream for the country and one extra quality for the cities/retail

ICM has developed its own retail network with rice markets in Kigali selling under its own brand (also small packages). The fact that ICM develops its own rice brands is seen all over the world. However, that a rice miller is developing retail business is uncommon but necessary to protect brand and quality. Many local retailers do not care so much on quality and on mixing good & bad quality and sell as Grade I and II.

5. Mapping of the rice mills and associated cooperatives

From February 13 to February 18 , 2012 a round trip was organized to review the rice processing activities in the three main rice producing provinces of Rwanda. During this trip the RD expert was accompanied by representatives of MINICOM, RAB, and the RSSP project. Besides the rice mills, meetings were held with representatives of cooperatives active in the rice production.

Information was provided by RAB, RSSP, and gathered from interviews with cooperatives and rice processors.

5.1. Total area under production in Rwanda

<i>area under rice production</i>		incl. new developments	New developments (ha)	
total area ha	10.150	14.850	Western province	700
		14.850	Southern province	1.000
of which under irrigation	10.150			
harvests/year	1,5	1,5	Eastern province	3.000
average yield paddy	5,0	5,0		
			Total	4.700
Total paddy production	76.125	111.375		
paddy for seed, consumption and losses 35%	26.644	38.981		
paddy remaining for the market	49.481	72.394		

The table was created taking in consideration the following assumptions:

1. 2 harvests per year are normal but due to the fact the conditions during the two harvest are not the same a multiplier of 1,5 was used instead of 2.
2. The information on total area under production was provided by RAB and RSSP, but it is known that a lot has to be done yet to optimize the irrigation systems. That's why it is maybe better to read as "area available for rice production".
3. After discussions during meetings with cooperatives it was concluded to calculate 35% for home consumption, seeds, and post-harvest losses.
4. According to the information received from RSSP and RAB yields are varying from 4 ton/ha to 7 ton/ha and it was decided to use 5 ton/ha for calculations.

The table shows that a total paddy production of some 76,125mt was realised in 2011 of which some 49,481mt was available for marketing (the difference was either lost, used for seeds or consumed at home).

5.2. Total available milling capacity in Rwanda

The table below was created taking in consideration the following assumptions:

1. All paddy available for the market (i.e. 49.481mt, see table above) is processed in the officially registered mills (which of course is not the reality at present due to side selling to traders).
2. As rice milling only becomes profitable when mills are able to process large volumes of paddy, occupancy rates were calculated based on 2 shifts per day (80 hours per week) and in total 50 weeks of production.

industrial mills (incl new government mills)			Total milling capacity/h	
	19	19 + expansion in	existing (incl new)	future
number of mills	19	19 + expansion in		
theoretical capacity/h all mills together	36,6	43,8	western province	8,3
total hours of production needed to process	1352	1653	southern province	11,3
total production weeks based on one shift	34	41	eastern province	17
total production weeks based on two shifts	17	21		2,5
			Total	36,6
Occupancy rate based on two shifts 50 wks/year	34%	41%	milling capacity/year (2 shifts)	146.400
				175.200

Observations:

- Total milling capacity is 36.6mt/hour hence 146,400mt per annum (assuming 80 hours per week, 50 weeks).
- Including future extensions, milling capacity increases to 43.8mt/hour or 175.200mt/year.
- Capacity utilisation is low with 34% at the moment increasing to 41% after the extensions.

Data collected in the Western Province

<i>area under rice production</i>		incl ext
total area	1850	2550
of which under irrigation	1850	2550
harvests/year	1,5	1,5
average yield paddy	7	7
Total paddy production	19425	26775
paddy for seed , consumption and losses 35%	6799	9371
paddy remaining for the market	12626	17404

According to the information received the yield in the Western province is 7.8 ton/ha but for calculation it was advised to use a figure of 7 ton/ha.

In the Western provinces the expert team visited 4 rice mills: MBIC Bugarama, SODAR Bugarama, Dukhore, ICM Bugarama. A small rice mill of a former cooperative was checked but no information was available on this mill.

Processing capacity		
paddy available for processing	12626	17404
available milling capacity ton /h present	8,3	13
Total hours of production	1521	1339
Total weeks of production one shift 40 h	38	33
total weeks of production two shifts 80 h	19	17
occupancy % based on 50 weeks 2 shifts	38	33

Because the area will increase with an additional 700 ha the paddy available for processing will increase from 12,626 ton to 17,404 ton. The existing mills plan new investments in order to retain their registration and these investments will lead to an increased available milling capacity.

Assuming that all paddy available for processing will pass the registered rice mills the occupancy rate will be between 33% and 38% based on two shifts. However this assumption is far away from the present reality. According to the information received the mills were able to process last year 6,216 ton, which is circa 50% of the paddy available (see table above). The remaining is expected to be channelled through not registered mills or disappeared by illegal cross border trading.

Data collected in the Southern Province.

<i>area under rice production</i>		incl. extention
total area	4300	5300
of which under irrigation	4300	5300
harvests/year	1,5	1,5
average yield paddy	5,8	5,8
Total paddy production	37410	46110
paddy for seed, consumption and losses 35%	13094	16139
paddy remaining for the market	24317	29972

In the Southern province the yield is expected to be 5.8 ton-ha and an extension is foreseen of an additional 1,000 ha.

In the Southern province the expert team visited the following mills: Rwabuye-electromax, Mamba Rice, Karubanda Rice, Minoterie de Huye, and Gafunzo Rice. The team did not visit the Gigonko rice mill but information has been included in the calculations. The team had already visited this mill during previous missions.

Processing capacity		
paddy available for processing	24317	29972
available milling capacity ton /h present	11,3	11,3
Total hours of production	2152	2652
Total weeks of production one shift 40 h	54	66
total weeks of production two shifts 80 h	27	33
occupancy % based on 50 weeks 2 shifts	54	66

In this province the occupancy rates are the highest at between 54%- 66%. In reality last year the total paddy processed by the mills the team visited was circa 6,000 ton (i.e. only 25% of the paddy available).

Data collected in the Eastern province

<i>area under rice production</i>		extention
total area	4000	7000
of which under irrigation	4000	7000
harvests/year	1,5	1,5
average yield paddy	5	5
Total paddy production	30000	52500
paddy for seed, consumption and losses 35%	10500	18375
paddy remaining for the market	19500	34125

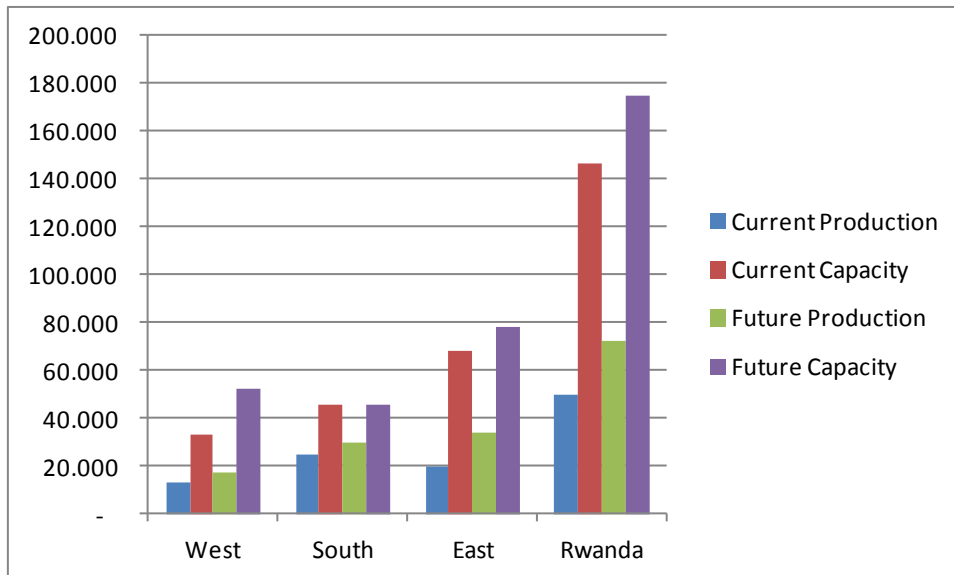
In the Eastern province the government has an impressive program under to reclaim marshlands totalling 3,000 ha. The yields in this area are on average 5 ton/ha.

The expert team visited the following mills: Ruhnda Kunda Umurimo Ltd, Cooperative CORIMI, ICM Rwamagama, Nyagatare Rice Mill Plants, and 3 new government factories.

Processing capacity	present	extended
paddy available for processing	19500	34125
available milling capacity ton /h	17	19,5
Total hours of production	1147	1750
Total weeks of production one shift 40 h	29	44
total weeks of production two shifts 80 h	14	22
occupancy % based on 50 weeks 2 shifts	29	44

In addition to the newly established 3 government mills also the cooperative CORIMI has invested in a second processing line of 2,5 ton/hour. Assuming that all paddy will be processed by the registered mills and that the program of reclaiming marshlands will indeed be completed the occupancy rate will be between 29% and 44% based on two shifts. However, the reality shows that according to information received during the interviews the total volume of paddy processed in the registered mills was only circa 4,500 ton last year. (circa 25% of the total available paddy).

Conclusion on the data collection



West	Current	Future	South	Current	Future
Production	12.626	17.404	Production	24.317	29.972
Milling capacity	33.200	52.000	Milling capacity	45.200	45.200
Utilization	38%	33%	Utilization	54%	66%

East	Current	Future	Rwanda	Current	Future
Production	19.500	34.125	Production	49.481	72.394
Milling capacity	68.000	78.000	Milling capacity	146.400	175.200
Utilization	29%	44%	Utilization	34%	41%

Note: Production means available paddy production after 35% losses

- Assuming that information received on areas under production and yield are correct the occupancy rates of the processing industry remain a serious point of concern, even in the situation the extended marshlands are in production.
- Looking at the real processed quantities of all processors the team interviewed it appears that the greater part of the paddy production is channelled through informal circuits without any control, or that the basic assumptions on areas under production and yields are much lower than expected (please see table below).
- From the original paddy volume of 76,125mt produced by farmers, 26,644 (35%) is lost before arriving at the coops due to seeds, consumption and losses. Of the remaining 49,481mt only some 17,000mt is actually milled by the industrial mills (some 34%) while the majority ends up in the informal circuit (32,481mt or 66%)
- If you compare the Eastern, Western and Southern district the biggest problem is currently in the East among others due to the addition of three new mills constructed by the

Government. The calculated capacity utilisation is 29% but the real utilisation is probably much lower.

5.3. Ownership of the rice processing factories.

Ownership of the mills	
name of the	shareholders
western province	
MBIC Bugarama	15 shareholders representing 15 farmer groups
SODAR Bugarama	Catholic church 40%, Caritas 10%, SOPAV (input supplier) 50%
Dukhore	43 shareholders
ICM Bugarama	60% ICM Rwandese Government 40%
southern province	
Rwabuye Rice	Electromax
Mamba Rice	Private company
Karubanda Rice	Private company
Minoterie de Huye	Private company
Gafunzo Rice	District Authorities opting for privatization (private investor+ cooperatives)
Gikongo Rice	ICM 60% + Union Ucoribu 40%
Eastern province	
Ruhnda Kunda	private company
Cooperative	cooperative 1213 members
ICM Rwamagama	ICM 60% and Rwandese Government 40%
3 new Government mills	Government opts for privatization to create a partnership between private investors and cooperatives

In this list of registered processing enterprises one mill is 100% owned by a cooperative: the cooperative CORIMI. This cooperative has 1213 members and is very well organized with access to credits. They are producing on 160 ha but have options to expand this area once funding will be provided/organized.

A few companies are based on former cooperatives that transformed into limited companies to get easier access to financing, etc. MBIC, Dukhore are examples.

The three ICM mills started as a joint venture between the company ICM and the Government. The 3 mills alone represent a capacity of 7.5mt/hour or almost 40,000mt of paddy per annum (based on 2 shifts).

In Gigonko the Ucoribu Rice Union has replaced the Government as shareholder. Ucoribu is representing 10 cooperatives with 18,000 members in the Southern province. Although still a lot has to be done to create more member commitment and stronger cooperatives this JV model is becoming more and more successful.

The newly established government mills and also the Gafunzo Rice company are in the process of privatization but details on the process are not clear to the expert team.

5.4. Design of the rice processing factories

The processing factories in Rwanda are mixed, from very basic to well-designed modern rice mills able to produce good quality end-products. In a document prepared for the Ministry of Agriculture and Animal Resources with the title "Enabling Self Sufficiency and Competitiveness of Rwanda Rice" the flow chart of operations that requires to be followed in a typical modern rice mill was given. However, also this design will only lead to good quality end-products when there is a good management and qualified labour in place.

Based on the fact that the Government of Rwanda wants to increase the quality of the locally produced rice the RD expert fully supports the proposed design of rice processing (with some changes in order) that was proposed in the above mentioned report. This means that at least the following set of equipment has to be installed:

1. Pre-cleaner: to take out impurities from the paddy
2. De-stoner: to separate stones from paddy
3. Rubber-roll husker with husk aspiration to remove the husk from the rice kernel (brown rice)
4. Paddy separator; to separate brown rice and paddy and to return the paddy to the husker
5. 1 or 2 abrasive whiteners
6. 1 friction whitener
7. Polisher
8. Grading sieves
9. Length graders
10. Blending
11. Bagging station

In contrast to the flow chart presented in the report mentioned above we suggest the following changes:

- To install the de-stoner immediately after the pre-cleaner to protect the rubber roll husker from stones.
- To put the polisher before the final grading (sieves and grading cylinders) to protect them from bran which will influence the grading results.

If this design is going to be the standard for the rice processing activities in Rwanda than the following processors should qualify:

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Western province

- SODAR Bugarmama
- ICM Bugarama

MBIC Bugarama and Dukhore are in the process of installing new mills and the design needs to be checked before conclusions can be drawn.

Southern province

- GAFUNZO Rice
- Gigonko Rice

Rwabuye Rice/Electromax has the right design but status of maintenance should be checked. Kurabanda Rice has also an acceptable design but grading and maintenance need to be checked.

Mamba Rice and Minoterie de Huye have simple one-pass operations (husking and whitening in one go). This process is not bringing the best results.

Eastern province

- ICM Rwamagama and the newly established Government mills will easily qualify.
- Cooperative CORIMI is in the process of installing additional 2,5 ton/h mill and the design needs to be checked.
- Nygatara Rice Mill plants has in principle a good set of equipment but surprisingly it has been installed in the wrong order. Furthermore we have the opinion there are some management problems. Poor quality of rice in grade one bags, and piles of white rice stored outside under tarpaulins.

General observations

During the mission most of the small mills visited had the following design/ flow chart:

Pre-cleaning- de-stoner- husker+ whitener in one pass- grading by sieves- bagging station. The quality of the processed white rice is in these mills is strongly depending on management and maintenance and frequent control of their activities is needed to assure the process according to the standards.

5.5. Main issues for the rice processors

Low quality of the paddy

Most of the rice processors expressed they had problems with the paddy purchased from cooperatives and traders. The low quality is decreasing their milling yields and according to the millers this is mainly caused by the low quality of seeds, lack of fertilizer use, and absence of

proper infrastructure to dry, pre-clean and store paddy after harvest (see issues mentioned under paragraph 3.2).

Contract enforcement

All the industrial mills are trying to sign contracts with the cooperatives. However, it appears that in reality the cooperatives are violating those contracts. According to the management of the cooperatives they are forced by the members to sell at the highest price possible and that's why they sign contract with all mills and deliver to the mill offering the highest price or even to traders passing by. The managers expressed that if they stick to the originally signed contracts the members will not deliver the paddy to the cooperative but directly to the paddy traders.

The fierce competition of the traders

The cooperatives are using a tender procedure to sell the paddy to the traders/processors. The processors complain they lose the bidding process due to the fact that the traders and the processors don't have the same conditions. The business of traders is mainly cash based, which is badly administered and difficult to monitor for tax authorities, etc. The industrial mills have huge investments, low occupancy rates resulting in high costs, and they have to fulfil their tax obligations. Even the Gigonko rice mill is suffering from this situation caused by the fact that the members of Ucoribu are not fulfilling their delivery duty to the cooperatives. Some of the cooperatives do not have storage facilities and the members are drying and storing the paddy at their homes. This system makes it very difficult for the cooperative to avoid/ monitor side-selling activities of the members.

The rice quality in the consumer market

The consumers have a preference for imported white rice from Pakistan, Vietnam and Tanzania. They have the opinion that the locally processed rice is from a lower quality. The industrial mills put a lot of effort in processing and marketing a good quality of locally processed white rice. Unfortunately there is a negative influence from traders, some small millers, and wholesalers who don't care about putting quality rice in the market. Evidence is there that sometimes grade III was sold as Grade I, qualities were mixed, and inferior rice was put in second hand bags of the well-respected industrial mills.

6. Recommendations & Road Map

6.1. Capacity building at cooperative level

For farmers who wanted to be active in the marshlands being a member of the cooperative was an obligation. However, most of the cooperatives are still very weak and are also lacking member commitment. That's why a capacity building program for board, management and members of the cooperatives is necessary.

The assistance program needs to focus on the following elements:

1. Development of farmer organizations into cooperatives based on economic principles
2. Business principles of a cooperative
3. Business practises of a cooperative
4. Capitalisation and financing, creditworthiness and bankability
5. Governance and organisation structure
6. Communication with members

6.2. Consolidation of cooperatives active in the same marshland area

In some marshlands Unions were established but the effectiveness of those unions is questionable. In many cases it is only seen as an additional cost factor between the member, his cooperative and the processor. In principle, a one-tier organisation combining the post-harvest handling functions of the cooperatives with the marketing and logistic functions of the Union would be a more efficient solution. Economics of scale can also be reached by consolidation of small cooperatives into one big cooperative with local divisions. This will lead, assuming capitalization and zero-loss policies are in place, to access of finance to organize investments and input services for the members. As aforementioned in paragraph 2.1, it is crucial that the reasons for any consolidation are well communicated to the members. Please refer to chapter 8 for a detailed action plan.

6.3. Investments at cooperative level

The cooperatives are lacking the basic infrastructure to maintain a good quality after harvesting the paddy. All handling is manually carried out. Concrete drying floors and storage facilities are lacking due to the lack of financing at cooperative level. A Government program needs to be developed to support well performing cooperatives in creating the urgently needed infrastructures. After consolidation of the small cooperatives the development of central collection points and centralized artificial drying and storage facilities need to be studied. This will allow better monitoring of paddy by the cooperatives.

6.4. Partnerships with the processors

The well-developed strong cooperatives should be allowed to become shareholder in the modern industrial mills. Key criteria should be:

1. A well-organized, committed member base,
2. proper management
3. sufficient own capital

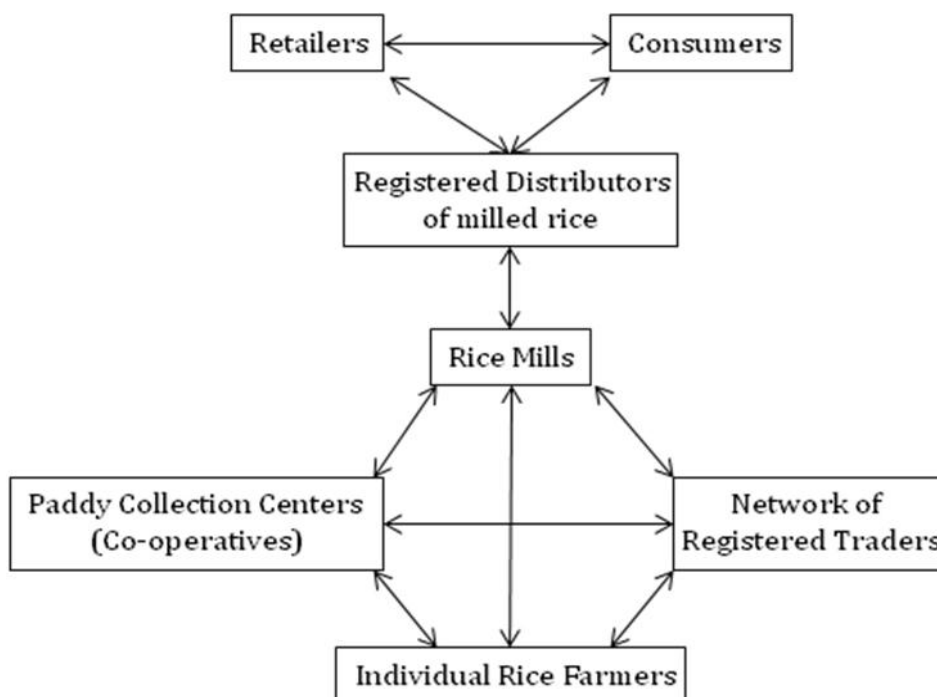
Forward integration by good coops will diminish the present sourcing problems of mills. This should not be accomplished via a grant but through a normal acquisition by the cooperative. However, the cooperative may be facilitated by a gradual buy-in via retaining the dividend in the first 5 years. For example, via retaining the dividend to the cooperative of say 20 RWF/kg a large cooperative or Union can save say $4,000,000\text{kg} \times 20 = \text{RWF } 80 \text{ mln}$ per annum to increase its share in the mill. It is key that as soon as possible, (part of the) dividend is released to the members to increase loyalty of the members to the mill.

6.5. Cooperation between RAB and the rice industry

The rice sector is in an urgent need of new seed varieties and it is strongly advised that selection should be done in close cooperation with the milling industry. That is, any new variety should be driven not only by productivity considerations but also by milling yields and consumer preferences. At this moment there is a lack of cooperation between Research Institutes such as RADA and processors. This needs to change.

6.6. Minimise the role of the paddy traders

Following the efforts to develop a Rice Sector Policy the following structure was proposed:



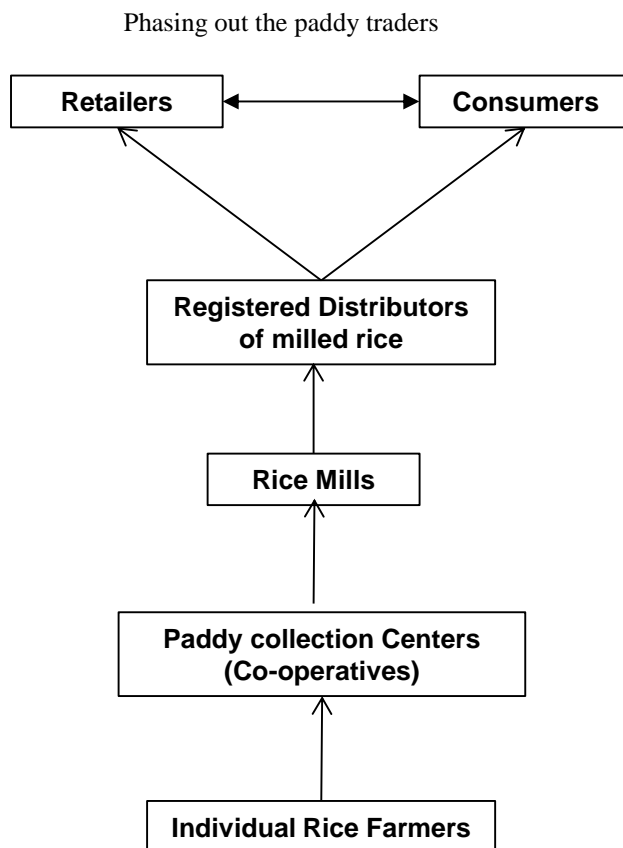
Taking into consideration the objective of the Rice Sector policy is to develop the sector in such a way that the Rwandese population will be provided with sufficient good quality rice at a fair price, an efficient strong value chain is a prerequisite.

It appears that at present the paddy traders are undermining the cooperatives by directly buying at cash from the members. It is also clear that due to the way the traders organize their business monitoring of production volumes through the value chain is very difficult. It appears that a serious volume of paddy disappears in an informal circuit where quality is not so much of an issue.

The most efficient way to strengthen the value chains is as follows:

The individual farmers (being members of the cooperative) deliver the paddy to the cooperative and the cooperative sells the paddy to the rice mills based on tenders or forward contracts. The expert team was informed that one of the reasons the present system exists (involvement of cash traders) is the fact that farmers have an urgent need of finance to organize their inputs for the next harvest. However, with strong cooperatives in place organizing the marketing and inputs this is not going to be a big issue.

If this phasing out of the paddy traders is one step too far at least the Government should allow only registered traders with proven connections with the processing industry to be in the market. In addition to that all transactions should be done by bank transfers and properly administrated. At the end of each season the traders should be audited officially and in causes of defaults as a penalty lose their license.



6.7. Capacity building of the Rwanda Bureau of Standards

- The Government undertakes a lot of efforts to improve the situation in the Rwandese rice sector. However, seen the fact that the greater part of the activities are taking place in the “grey” informal circuit at present, setting the standards is not enough. Capacity has to be created to monitor the implementation of the standards developed and to enforce penalties if needed.
- In this respect, Common Fund for Commodities (CFC) has indicated to Rabobank to be willing to consider sponsoring capacity building of the RBS. It has a rice milling specialist who could be appointed for this project to support the RBS staff. RD will be happy to liaise between MINICOM and CFC to realise this project.
- The RBS has to develop the minimum standards for the equipment to be used, the operational manuals for the processing, the rice qualities that are accepted (see Chapter 4.4).
- Seen the fact that the occupancy rate of the processing industry is low the RBS should be reluctant to issuing licenses for new companies interested to enter the market (unless there is a compelling business case).
- Periodic auditing of companies active in rice processing is needed and if they abuse the rules the penalty has to be that they lose their license to process and market the rice.
- However, also a system has to be developed to check the activities and products in the wholesale and retail markets (the current practise of mixing different grades undermines the whole industry).

6.8. The privatisation process of the newly established mills

The expert was informed the Government has the intention to privatize the newly established rice mills. The government has preference to a model similar to the Gigonko – Ucoribu model. (A private investor + a union of cooperatives/ or directly with cooperatives).

This model is certainly a model that could create a strong relationship between paddy farmer- cooperative- processor- consumer market. If implemented in the right way it will create an efficient value chain with benefits for all players involved.

However, it is strongly advised to transfer the ownership to cooperatives step-by-step. The cooperatives opting for shares first have to qualify themselves following certain criteria.

The first step could be that the Government sells 60% of its shares to a private investor active in rice processing.

The second step is the selection of the cooperative candidates (joint effort of both private investor + Government) . The most important is the geographical place of the cooperate(s).

Cooperatives selected have to show that they have committed members, good governance, and capitalization policies in place.

The sales/transfer of shares should be done in a certain time plan (f.i. 4 or 6 seasons where the cooperative has to show it is performing well and delivering all paddy to the processor.)

7. Conclusions

- In order to improve the situation for the locally produced/processed rice a reformulation of the Rwanda Rice Sector policy is urgently needed. At present still a large quantity of low quality rice is without any control entering the consumer market.
- The new policy should aim to channel a maximum of paddy through the cooperatives to the registered mills. This can be stimulated by curbing down on paddy traders either by prohibiting paddy trade altogether or only registering those traders that deliver to the registered mills.
- Rice prices in the consumer market are also related to world market prices and it appears that the total of production cost and processing costs already create a situation that it is sometimes difficult to compete with the imported rice from abroad (e.g. farm gate paddy prices are 70% higher than in Vietnam).
- One of the reasons for the high production cost at farm level are the labour costs. Due to the fact that the plots are very small mechanization is more or less impossible. It is strongly advised not to allow further diminishing of plots by sale or disposition and to promote pooling of land to reach economies of scale.
- For the cooperatives a capacity building program needs to be carried out especially focusing on: governance, member commitment, capitalization and zero-loss policies.
- For well – organized cooperatives investment schemes/ guarantee schemes need to be developed to support investments in collection points, storage and drying facilities.
- The best Coops and Unions should be allowed to become a shareholder in privatised mills preferably in a joint venture structure with an experienced industrial company.
- The quality of the processed white rice in most small mills is strongly depending on management and maintenance and frequent control of their activities is needed to assure the process according to the standards.
- One of the key issues in the sector is the lack of enforcing power at the RBS. A capacity building program is required to increase the impact of RBS. Possibly, additional resources can be mobilised via the CFC.

8. Action plan Cooperatives

Action plan		jun-12	jul-12	aug-12	sep-12	okt-12	nov-12	dec-12	jan-13	feb-13	mrt-13	apr-13	mei-13	jun-13	jul-13
Cooperative consolidation															
Rice sector Rwanda															
1. Map [60] cooperatives & Unions															
- Nr of active members															
- Ha under cultivation															
- Delivery record members to coop															
- Delivery record coop to market															
- Margin taken by Coop & Union															
- Price paid to farmers															
2. Rating [60] coops & Unions															
- management															
- financial performance															
- corporate governance															
- irrigation maintenance & post-harvest logistics															
- market linkages															
- member delivery performance															
3. Conclusions															
4. Draft consolidation plan															
5. Sensitising outcome with coops															
6. Implementation of consolidation program															