SOUTHERN AFRICA TRADE HUB

Technical Report:

Maize Value Chain in the SADC Region

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LIST OF ACRONYMS

ABC	Agribusiness Chamber
ACE	African Commodity Exchange (Malawi)
ADMARC	Agricultural Development and Marketing Corporation
AFMA	Animal Feed Manufacturing Association
BFAP	Bureau for Food and Agricultural Policy
BMI	Business Monitor International
COMESA	Common Market for Eastern and Southern Africa
CV	Coefficient of Variation
DRC	Democratic Republic of the Congo
EAC	East African Community
FAO	Food and Agricultural Organization
FEWSNET	Famine Early Warning Systems Network
FOB	Freight on Board
FRA	Food Reserve Agency
FSRP	Food Security Research Project
GIEWS	Global Information and Early Warning System (FAO)
GMO	Genetically Modified Organism
INVC	Integrating Nutrition in Value Chains
MSU	Michigan State University
MT	Metric Ton
NASFAM	National Smallholder Farmers Association of Malawi
NFRA	National Food Reserve Agency
NGO	Non-Governmental Organization
NTB	Non-Tariff Barrier
REC	Regional Economic Community
SACAU	Southern African Confederation of African Unions
SADC	Southern African Development Community
SAGIS	South Africa Grain Information Services
SATH	Southern African Trade Hub
SPS	Sanitary and Phytosanitary
SWOT	Strengths/Weaknesses/Opportunities and Threats
US	United States
USAID	United States Agency for International Development

USDA	United States Department of Agriculture
WFP	World Food Program
ZAMACE	Zambian Agricultural Commodities Exchange

EXECUTIVE SUMMARY

This report synthesizes current available information for the Maize Value Chain in the Southern African Development Community (SADC). It identifies issues regarding the end consumer, supply and demand as well as trade issues. It also addresses issues regarding smallholder contributions to maize production in SADC. As South Africa is the largest producer of maize with the most developed market, the South African value chain information may serve as a benchmark for other countries in SADC.

Africa, and specifically SADC, has become more globalized and interdependent on the world economy. SADC is characterized by rising economic growth and income per capita and increasing levels of urbanization. This implies changes in consumer consumption patterns towards higher value foods. It is also tied into the global economy, which makes it sensitive to the market opportunities created by increasing global demand for maize as well as to the volatility of global prices.

Maize remains crucial for food security in Southern Africa, accounting for an average of 36% of all caloric intake in the region. The predominance of the crop in farming systems and diets implies that yield gains have the potential to jump-start a significant improvement in nutrition which can be compared to those experienced in Asia for rice and wheat.

A high level of volatility in annual production is due to climatic conditions that can vary from one season to the other. Maize is produced under rain fed conditions, making it an especially vulnerable crop. Overall, productivity in the region (excluding South Africa) has stagnated, depending on increased area under cultivation to lead to increases in production.

The policy environment regarding staple grains is highly unpredictable and creates uncertainty with value chain stakeholders, leading to problems with commitment from the private sector to develop agricultural markets and depriving smallholders of services and markets.

The trading environment is characterized by a lack of harmonization in cross-border trade, standards and significant non-tariff barriers such as domestic regulations. Administrative procedures imposed to ensure food security, product safety and address environmental issues are distorting the trade of goods, services and factors of production. This environment creates an uncertain investment climate, often creating a disincentive to private sector actors to make significant investments.

Driving change

In order to stimulate changes in maize productivity and increase benefits for small farmers, there must be an increase in the formalization of the marketing channels and a change in the structure of production. The common characteristics of primary maize production in the SADC region are small farm sizes, low yields, large post-harvest losses and fragmented marketing channels. The major opportunity for increasing productivity in commercialized maize will derive from a formalization of the marketing channels. Improving the availability of accredited storage facilities and stimulating investment by lead firms in the region will improve logistics, access to inputs (hybrids, fertilizers and crop protection products) and use of good agricultural practices leading to increased productivity. Leading characteristics of a more formal commercial marketing system include:

1. Commodity exchanges, including futures and options markets, enabling farmers and marketing agents to reduce risks of current and future investments;
2. A network of integrated silos, millers and supermarket retailers, often with transnational firm ownership;
3. Market information accessible on a daily basis, some of which is public, and some of which is proprietary, providing asymmetric information advantages for those willing to pay;
4. Large transaction volumes, which enable transaction costs to be spread over greater quantities traded, hence reducing per unit marketing costs;
5. Well-defined grades and standards to allow for remote contracting by commodity specification rather than by visual inspection;
6. Legal systems to accommodate more sophisticated contracting arrangements and facilitation of contract disputes; and
7. Organized lobbies representing firms widely perceived as having a legitimate interest and voice in the determination of regulations governing agricultural markets.

Not all of these elements are within the Southern Africa Trade Hub's (SATH's) scope. However, the recommended point of intervention is to start with improved storage systems as the main point of leverage, which will reduce post-harvest losses, improve aggregation of product for larger transactions, act as a point for instituting improved grades and standards and provide access to finance through inventory credit schemes (including warehouse receipts). SATH's work in grain warehousing will not only impact the maize value chain, but will also be leveraged across other cash crops, such as soy, groundnuts, and cotton, for which storage, transportation and crop financing are needed.

The recommended approach for SATH is to work primarily with private sector associations and service providers to build the capacity of local service providers, create linkages between providers and seekers of services, improve access to the latest technologies, introduce private sector models to improve the management of the value chain, increase access to finance and seek opportunities to support outside foreign investment.

In policy advocacy work, we will focus primarily on empowering the private sector to advocate with national governments and the relevant regional economic communities (RECs) on those high priority constraints that will be realistically tractable over the life of the project. We will work with existing groups such as the Agricultural Business Chamber and Grain SA, and explore the development of a regional organization such as the Southern African Grain Council.

Recommended activities to drive formalization fall into three major categories:

1) Development of warehouse and storage networks

a) Facilitate the establishment of warehouse networks across the key maize-producing countries of Zambia, Malawi and Mozambique.

b) Assist implementation of a warehouse receipt system in those same three countries which will increase demand for warehouse storage, increase the liquidity of the farmers and build the basis for price risk management services.

c) Facilitate improvements in grain transportation and handling – especially bulk -- in the SADC region.

d) Encourage investment in commercial production, storage, transport and services.

e) Develop partnerships with both South African and U.S. firms, industry associations and government agencies involved in the maize value chain to help them extend trade, investment and other services into SADC.

2) Improved access to production, marketing, and trade finance

a) Develop better information on opportunities in maize value chain investment (e.g. inventory/analysis of grain storage options in SADC). Organize buyer/seller missions and participation at major trade shows (e.g. NAMPO) that will bring greater access to markets, technology and finance for producers.

b) Improve market price information services, and more price transparency, through support of commodity exchanges with a regional focus.

c) Promote development of yellow maize as commercial cash crop as a feedstock into animal feed.

3) Policy Advocacy

a) Work with both farmer groups and the Agricultural Business Council of South Africa to mobilize SADC-wide stakeholder support of policy measures to support trade and investment in maize production and marketing.

b) Encourage adoption of conventional and genetically modified (GM) certified maize seed.

c) Continued work on the cross border transport constraints that increase the cost of inputs and services into the region.

1. INTRODUCTION

This analysis of the maize value chain in Southern Africa is prepared with the purpose of highlighting the key issues in the value chain related to its production, trade and utilization in the region as an input into the Southern African Trade Hub's (SATH) implementation strategy. Given the importance of maize in the region and the amount of research that has been carried out at national levels, this document will focus on the major overarching issues around the value chain, to inform the main issues in areas in which SATH has a comparative advantage to address.

This report looks at the end markets and utilization of maize, the status of and issues in production and processing and the trade of maize to present the value chain from a regional perspective. It will take into consideration the variances between countries and the main factors affecting the flow of maize in the region. This will identify the synergies that can be developed to generate a more conducive environment for growing the value chain as a whole through improved efficiency leading to increased productivity, and increased trade.

Maize is the most important cereal and basic food crop in Southern Africa, accounting for more than 36% of total caloric intake from cereals across the region. It accounts for much higher percentages among the rural, poorer population. In addition to direct human consumption, it is also a leading input into animal feed and an intermediate product for industrial use as components of other food products or oil. As such, maize not only plays a critical role in the food security of the region, but also as the dominant driver of the systems in support of agriculture as a whole, it provides the volume to make services necessary for efficient grain trade. It provides the main market for services such as storage, extension, equipment supply, agricultural finance and commodity exchanges which are needed to provide the fabric of a commercial agricultural system.

Southern Africa produces, on average, between 18-24 million tons per annum, with 55% of that produced by South Africa, depending on rainfall. With total consumption of about 17 million tons per annum in the region, Southern Africa is a net surplus producer in most years. However, several countries are usually in net deficit (Mozambique, Namibia, Zimbabwe, Angola, Botswana) while others now usually have a steady surplus (South Africa, Zambia and Malawi). The food deficits/surpluses within the region are often balanced by international and regional trade and long term storage.

A large percentage of maize is produced directly for home consumption, especially by the poor. Yet, generally speaking, there have been no net increases in maize productivity in the region over the last 30 years, excluding South Africa. Thus, growth in production has come primarily from increased area under production. SATH's maize strategy should then focus on increasing the profitability/reducing the risk of maize production and trade in the region, with a particular emphasis on increasing the opportunities for emerging commercial farmers to enter into the commercial maize value chain.

Given the importance of maize within the overall food security strategies in the region, this analysis will highlight the main factors that are constraining growth in productivity and efficiency within the value chain. These will include not only the technological issues, but also the policy and regulatory factors that have affected the economic environment for maize production. This will lead us to a SATH strategy for addressing these constraints using a trade focused approach and an action plan.

2. MAIZE MARKETS

This section presents an overview of the main markets for the maize value chain in the Southern African Development Community (SADC) region. It begins with a description of the main final markets in which maize is consumed. We then go on to look at the global market for maize and its impacts on Southern Africa, and then briefly summarizes the important regional disparities between the different SADC members which drive the dynamics in Southern Africa.

Table 1 presents an estimate of the consumption of maize in the main SATH focal countries covered under this report. Prepared by Business Monitor International (BMI), these figures are fairly consistent[2] and provide a fairly accurate portrait of consumption across the region. These demonstrate the gradual increase in consumption of maize, reflecting the impact on increasing consumption of both population growth (direct maize consumption) and increased consumption of maize through processed foods and animal feed.

Table 1: Estimated Annual Consumption of Maize in SADC Countries (2007 – 2014)

	Actual					**Estimated**		
Country	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Angola	700	700	1,000	1,300	1,300	1,413	1,519	1,635
Botswana	140	143	275	200	185	190	218	248
Malawi (est.)	2,323	1,896	2,719	2,458	2,625	2,407	2,465	2,558
Mozambique	1,600	1,600	1,700	1,900	2,100	2,100	2,206	2,422
Namibia	125	141	175	175	175	160	168	173
South Africa	7,660	8,030	8,613	8,665	8,977	9,240	9,538	9,790
Zambia	1,200	1,250	1,450	1,700	2,000	2,200	2,310	2,425
Zimbabwe	1,050	1,400	1,125	925	1,200	1,350	1,404	1,460
Regional totals	14,798	15,160	17,057	17,323	18,562	19,060	19,828	20,711

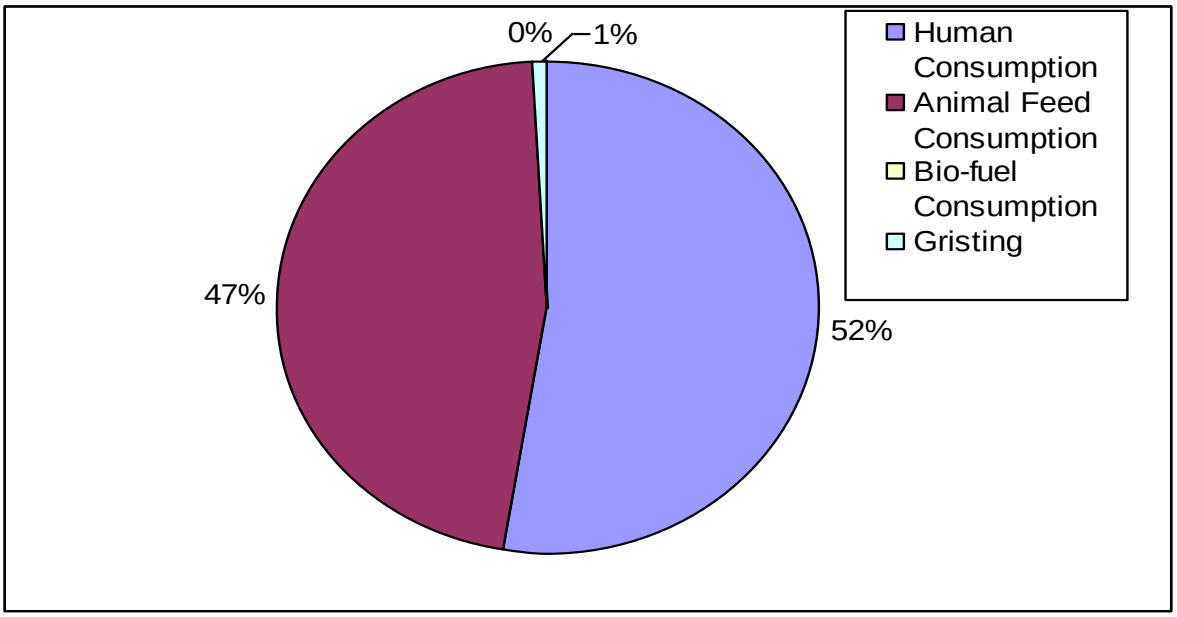
Source BMI USDA: Business Monitor International Country reports Southern Africa Agribusiness Report Q1 2012 (extracted from USDA Table 1, data from SAGIS and CEC)

[2] It is important to note that there is no single set of figures which are the same. For the sake of consistency, the BMI estimates are a reliable standard indicator to use.

2.1. Major End Markets

Consumption of maize can be divided into four main categories: direct human consumption, animal feed consumption, maize processed for industrial uses and bio-fuels. Human and animal feed consumption are the biggest consumers of maize, with maize allocated to milling for processed goods and oil as the third largest consumer. Over the past decade, limited amounts of bio-fuel have been produced in South Africa. Figure 1 shows the split within South Africa where human and animal feed consumption represents over 99% of maize consumption. As one moves into the other countries in the region, the split shifts to a greater emphasis on maize meal for human consumption.

Figure 1: Allocation of Maize to the Different Maize Consumption Categories



Source: SAGIS, 2010 & own calculations

2.1.1 Maize for Human Consumption

Table 2 demonstrates that maize is the single most important source of calories for people in the SADC region. As shown in Table 2, it provides nearly 71% of total caloric consumption from cereals in eight of the 12 SADC countries for which data is available. More importantly, it ranges from between 23% (Namibia) to 64% (Swaziland) of total caloric intake.

Table 2: Importance of Maize in Terms of Calorie Intake Information

Country	Cereals as % of total diet	Maize as % of Cereals diet	Maize as % of Total diet
Angola	35%	77%	27%
Botswana	56%	55%	31%
Lesotho	75%	65%	49%
Malawi	67%	91%	61%
Mozambique	44%	66%	29%
Namibia	60%	38%	23%
South Africa	54%	65%	35%
Swaziland	75%	85%	64%
Tanzania	38%	68%	26%
Zambia	69%	90%	62%
Zimbabwe	62%	76%	47%

Source: Monitoring The Food Security Situation in SADC (2006) and own calculation.

Consumer preference in Southern Africa favors white maize which dominates the segments of the value chain destined for human consumption.[3] South Africa also produces yellow maize which is mainly used for animal feed manufacturing and less for human consumption.

Maize is primarily consumed as a prepared product mixing maize meal with water. Strong consumer preference is shown for breakfast meal (which is a very finely milled product) over roller meal (coarsely milled product) despite the poorer nutritional value. Depending on the country or the market, this maize meal might be processed industrially and then retailed to consumers, or it is milled directly at the household level, using either a mortar and pestle or through a small local hammer mills which produce a coarse ground product for direct consumption.

2.1.2 Maize for Animal Feed

Maize and maize by-products are also consumed as animal feed. While South Africa has a very large feed lot industry for beef, the single largest consumer of maize for animal feed across the other countries in the region is for poultry. Besides maize and maize meal,

[3] It should be noted that white maize is lacking in vitamins A, D and E that are present in yellow maize.

common by-products used for feeds include maize germ, gluten, husks and steep water (which is a by-product of industrially produced maize starch as described below).

The African Feed Manufacturers' Association (AFMA) estimates that maize accounts for between 50% and 60% of the volume of animal feed produced in South Africa, complemented by soya, sorghum and other additives. So maize is the dominant component of animal feed and, as demand for feed increases, demand for maize will increase the most.

The use of maize as animal feed has risen faster in Africa from 2005 to 2011 than the rest of the world. The growth rates of various regions are presented in Table 3 below, which shows that sub-Saharan Africa, in general, has had a 43% increase in the use of maize for feed since 2005. While the global average increase is 2% per annum, sub-Saharan Africa's 7.5% compounded annual rate stands out as the fastest in the world. Though starting from a smaller base than the other regions, this highlights the changing food consumption patterns in Africa, to include more protein. This trend is evident in Southern Africa as well.

Table 3: Feed Use of Maize by Region in Tons

Country	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011
Central America	2,925	3,275	3,150	3,050	3,100	3,250
East Asia	124,064	127,075	128,474	129,999	130,380	133,180
European Union	47,000	49,200	51,000	47,500	43,500	43,500
Former Soviet Union – 12	10,643	10,509	11,235	12,920	11,670	13,162
Middle East	11,640	12,640	13,700	13,485	13,450	13,675
North Africa	12,850	13,750	13,450	13,525	14,450	15,425
North America	176,248	164,273	175,177	156,153	158,831	159,196
Oceania	410	300	350	375	365	365
Other Europe	8,717	8,283	7,086	7,071	7,300	7,375
South America	48,324	51,372	54,387	55,029	56,830	59,530
South Asia	7,600	8,000	8,400	9,100	9,100	9,600

Southeast Asia	19,112	19,772	21,399	21,618	22,325	23,625
Sub-Saharan Africa	5,995	6,730	6,695	7,580	8,480	8,580
World	477,608	477,364	496,838	479,540	481,916	492,698

Source: Abbassian, 2009.

However, there are still major discrepancies in the use of maize between Africa and the rest of the world. In high-income countries, an estimated 70% of maize is destined for feed, with only 3% consumed directly by humans, the remainder is used for bio-fuels, industrial products and seed. In contrast, across sub-Saharan Africa (except for South Africa), 77% of maize is used as food and only 12% serves as feed.

In South Africa, which is quite different from the rest of Southern Africa, the Food and Agricultural Organization (FAO) estimates that roughly 53% of maize goes for non-food use, with animal feed accounting for 88%, and the rest to processing.

2.1.3 Maize for industrial use

Various products and by-products can be manufactured from maize. The two basic processes used in the industry are dry and wet milling. Dry milling is used primarily for human consumption (see above). Wet milling is far more capital intensive and is used for the production of starches, gluten and germ. These are then used in industrial products like adhesives, as intermediate ingredients in food products or for animal feed supplements and maize oil. The level of industrial use in SADC countries outside South Africa is small or negligible. Processed maize products are mainly imported into the region from South Africa.

2.1.4 Biofuel

At present, use of maize for biofuels is virtually insignificant in the region. While it is expanding considerably worldwide, less than 0.5% of current production in the region goes into biofuel. This is primarily due to South Africa's ban on production of biofuels from maize driven by a food security agenda.

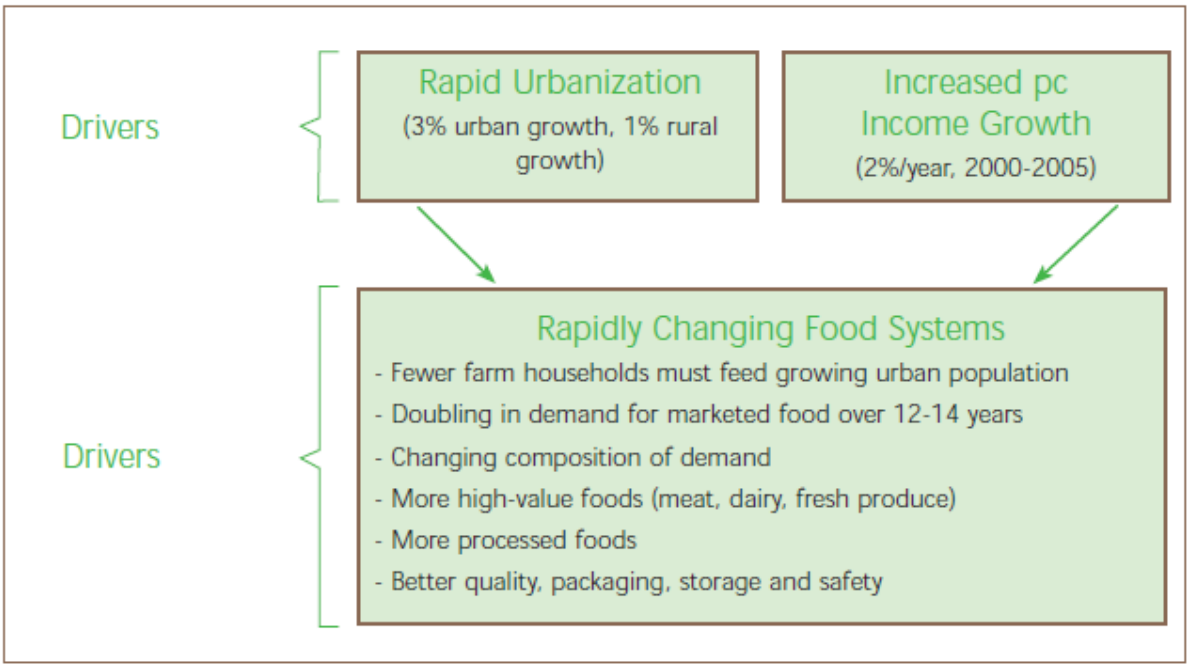
2.2. Implications for Total Maize Consumption in the Region

Africa's food consumption patterns are expected to change dramatically during the coming decades. Studies conducted by Michigan State University's (MSU) Food Security Research Project (FSRP) and Bureau for Food and Agricultural Policy (BFAP), (2011) on changing household consumption patterns within the region found evidence of rising urbanization and growing per capita incomes. These trends are expected to double the marketed volumes of foodstuffs and ramp up demand for high-value foods (dairy, meat and fresh fruits and vegetables), processed foods, packaged convenience foods and prepared foods (see Figure 2 below). These will open up increased market opportunities

for commercial production of maize, although it will not affect the bottom 50% of rural farmers in countries like Malawi and Mozambique, who are primarily subsistence oriented and outside of the commercial systems.

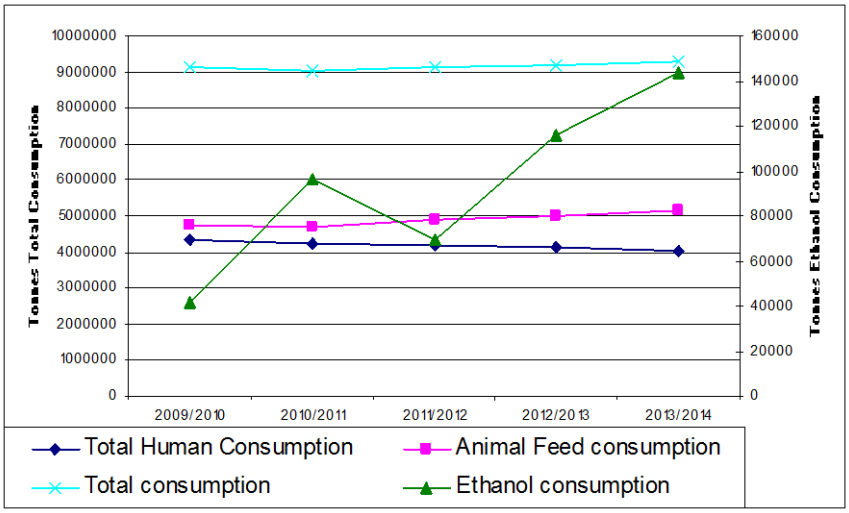
Within this overall framework, given the significant emphasis on human consumption, the growth of maize consumption in SADC (excluding South Africa) is driven primarily by population growth. Therefore, future maize consumption is expected to remain fairly constant with an expected growth rate of 0.51% per annum between the production periods 2009/2010 to 2013/2014.

Figure 2: Changes in African Food Systems - BFAP (Bureau for Food and Agricultural Policy), The South African Agricultural Baseline 2011.



As we look at the implications of the different types of markets, we see that animal feed production is expected to increase for the same production period at a rate of 1.87% per annum. At the same time, it is expected that human consumption of maize would decrease at a rate of 1.66% per annum. This gives an indication of the possible trend maize consumption could take in the following five years in Southern Africa.

Figure 3: Expected Consumption Levels of the Different Consumption Categories between 2009/2010 to 2013/2014 in South Africa



Note that the spike in anticipated ethanol use still leads to just over one tenth of one percent of total maize consumption, and will be insignificant for the foreseeable future in Southern Africa.

3. MAIZE PRODUCTION IN SOUTHERN AFRICA

3.1. Overview of maize production in Southern Africa

Depending on the source, figures on actual production of maize in the countries around the region are highly variable. Table 5 provides an overview of the total maize production in SATH's focal countries in Southern Africa, as estimated by BMI. This demonstrates how much the production fluctuates year on year, primarily depending on rainfall.

Table 4: Estimated SADC Maize Production and Consumption Patterns (2007–2014)

	Actual					Estimated		
Country	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Angola	700	642	1,200	1,250	1,250	1,300	1,300	1,300
Botswana	12	2	7	17	18	18	20	20
Malawi (est.)	3,226	2,634	3,777	3,415	3,646	3,343	3,423	3,553
Mozambique	1,380	1,534	1,710	1,932	1,880	1,900	1,972	2,105
Namibia	61	60	60	60	60	35	60	60
South Africa	6,947	7,339	13,164	12,567	13,421	12,000	12,300	12,768
Zambia	1,425	1,366	1,446	1,889	2,800	3,000	3,300	3,432

Zimbabwe	900	700	525	650	1000	1,400	1,500	1,600
Regional totals	14,651	14,277	21,889	21,780	24,075	22,996	23,875	24,838

Source BMI USDA: Business Monitor International Country reports Southern Africa Agribusiness Report Q1 2012 (extracted from USDA Table 1, data from SAGIS and CEC)

In contrast to the BMI data, the FAO's Global Information and Early Warning System (GIEWS) provides another estimate of production figures, which are in the same order of magnitude for each country.

Table 5: Reported Production (Tons) for Maize (2006 – 2010)

Country	2006-2010 Average	2009/2010	2011 forecast	% change 2009/10 to 2011
Angola	838	1321	591	-55
Botswana	28	38	33	-13
Lesotho	76	128	52	-59
Malawi	3176	3419	3895	14
Mozambique	1769	2090	2179	4
South Africa	10525	13297	11173	-16
Tanzania	3441	3600	3300	-8
Zambia	1784	2795	3020	8
Zimbabwe	1141	1354	1452	7

Source: GIEWS Country Brief 2011-2012

South Africa has the best information available and the South Africa Grain Information Services (SAGIS) provides more detailed information on South African production. The statistics highlight the differences between white and yellow maize, as well as the differences between commercial and subsistence farmers, demonstrating the dominance of commercial maize farming in South Africa, as well as the heavy emphasis on white maize (for direct human consumption) by the subsistence farmers.

Table 6: South African Maize Production Estimates (2010/11 – 2012/13)

		2010/11	2011/12	2012/13
Commercial maize	White maize	7,830,000	6,302,000	6,330,000
	Yellow maize	4,985,000	4,553,000	5,400,000
	Sub-total	**12,815,000**	**10,855,000**	**11,730,000**
Subsistence maize	White maize	422,000	396,000	390,000
	Yellow maize	184,000	168,000	180,000
	Sub-total	**606,000**	**564,000**	**570,000**
	TOTAL	**13,421,000**	**11,419,000**	**12,300,000**

Source: SAGIS, 2010 (2010/11 – 2012/13)

When one looks at issues of productivity in Southern Africa (outside of South Africa), the data in Table 7 is extremely revealing. It highlights that Southern Africa has the lowest average yields across Africa, and that increases in production of maize in the region are driven primarily by increased land under production, rather than by increases in productivity. In contrast to the rest of the region, South Africa's productivity has increased steadily, while land under production has decreased.

Table 7: Maize Area, Production, Yield and Consumption in Selected Regions of Sub-Saharan Africa, 1961-2008

	Eastern Africa	Southern Africa*	Sub-Saharan Africa*	South Africa
Maize area (million ha, 2005-2008)	7.79	6.99	24.84	2.46
Maize production (million tons, 2005-2008)	11.62	7.62	38.21	8.55
Maize yield (2005-2008)	1.49	1.09	1.39	3.45
Growth in maize area (%/yr, 1961-2008)	1.84	1.30	2.03	-0.89
Growth in maize production (%/yr,1961-2008)	3.02	1.30	2.99	0.98

Growth in maize yields (%/yr,1961-2008)	1.18	0.00	0.95	1.87
Average kg/cap/year (2003-2005)	26.9	81.8	39.6	104.2
Average % calories/cap/year (2003-2005)	19.3	36.1	19.1	30.8

*Excludes South Africa. Source FAOSTAT. See Appendix 1 for country classification used in this table

Source: Jayne, 2010

Given the high consumption per capita of maize in the region (double the rest of Africa as a whole), it is quite surprising that there have been no increases in productivity. The reasons for the lack of growth in productivity are most likely tied into the structure of agricultural production in the region, dominated by small farmers, which drives the technologies that are in use.

3.2. The Producers: smallholders, emerging commercial and commercial farmers

There are important structural differences among the countries in the SADC region, as is evident from the varying levels of production in the region. With some simplification, production in the region generally falls into two broad types: commercial farms or smallholders, with the latter divided between subsistence and commercial production. Commercial farms are characterized by extensive areas, use of mechanization, high quality inputs (most importantly improved seeds) and good agricultural practices. Smallholder farms, on the other hand, are characterized first of all by their small size, use of unimproved seeds, low (or more often no) use of fertilizer or pesticides, low financial resiliency and often a production logic that favors risk mitigation over maximizing financial returns. However, there are gradations between the commercial and the commercially-active smallholder farmers, or the emerging commercial farmer, who are trying to apply commercial farming techniques but are not yet able to take advantage of all commercial farming elements.

However, the structure of production outside South Africa is dominated by the large numbers of subsistence farmers who are not active in the trade of maize at all (more than 50% of total farmers and more than 50% of production). Most of our analysis focuses on the commercially oriented farmers (those who sell the majority of what they produce).

Defining Commercial Agriculture

The World Bank's *All Africa Review of Experiences with Commercial Agriculture* (2008)[4] defines the characteristics of "commercial" agriculture as crops "primarily produced for the market", i.e. not home consumption. It is not necessarily dependent on scale of production

[4] All Africa Review of Commercial Agriculture, Lessons from Success and Failure, Poulton, Colin, et al, February 2008, p.9.

or related to particular types of crops. The report identifies three differentiated "farm systems", all of which can engage in "commercial" agriculture. These are:

- *"family farms" (i.e. smallholders), characterized by the predominant use of family labour, no permanent workers and, at the most, only seasonal labour hired for peak production times;*
- *"small investor farmers" where the owner and perhaps other family members are involved primarily in management and supervisory capacities, whilst the bulk of the labour input is provided by hired farm workers (typically including several permanent, full-time employees)*
- *"large-scale commercial farms" where family labour is exclusively or predominantly managerial. There is permanent staff or full-time hired farm workers and these hired farm staff are to some degree specialized (e.g. drivers)*[5]

Key characteristics of each category are summarised in Table 8 by Collier (2009). Even though there are few large scale commercial producers compared to the numbers of small producers in the region, they have a major impact on total regional production. In contrast, there are many subsistence producers (more that 50 % of farmers in Malawi, Zambia, Mozambique and Angola), but their scale of operations is relatively small and they are not producing for commercial sale.

The agricultural sector, which has a dualistic nature, is in a state of transformation. It is comprised of a small (in terms of farmers) commercial sector and a large (in terms of farmers) subsistence sector. Both categories experience serious – though very different - problems affecting production and food provision.

Table 8*:* Key Characteristics of Subsistence and Commercial Farmers

	Subsistence producers	**Commercial producers**
Numbers	Large	Small
Size of operations	Small	Medium to large
Strategy	A secure, diverse and improved livelihood through agricultural and non-agricultural activities. Risk control and minimisation The input allocation to food production depends on the opportunities.	Maximising income from producing food Risk takers
Inputs	Low external inputs Operate usually on communal land systems, and holdings	High level of external inputs Usually on private and fenced off land.

[5] Ibid, p 10

	are not necessarily delineated or fenced off.	Commercial producers may also be found in communal lands, usually in fenced off parts.
Type of products	Multiple, used for own consumption	Few, specialised products
Equipment	Minimal	Mechanisation and intensification (e.g. irrigation)
Financial capital	Minimal	High and access to credit
Practices	Low-input low-output system Simple practices aimed at diverse and secure yields Competition for household inputs with non-agricultural sector	High-input, output system Modern practices aimed at profit maximisation
Human resources	Mostly indigenous skills	Mostly modern agricultural and management skills
Status	Many are food insecure	Food secure, but profitability variable and dependent on government support
History	Often disadvantaged (e.g. South Africa, Namibia and Zimbabwe)	Historically advantaged with access to best land, sufficient water resources and subsidies
Policies and politics	Political and donor priority Access and use of support is often limited Need to improve agricultural capabilities and production	Reduced political power Subject of substantial reforms (e.g. land, access to water, subsidy policies)

Source: Collier, 2009

The relative mix between commercial and smallholder production is highly variable among the SADC states. The relative strengths of each can be inferred, to some degree, from the data in Table 9, which presents the average sizes of both types of farms in all the SADC members. Countries with a notable commercial farm sector tend to be those in which the average size of commercial farm is over 50 hectares in size with substantial capital invested, depending on what is being produced. In Table 9, the countries with average commercial farms under this threshold tend to be the countries with the weakest commercial farming sectors. Thus, in these countries, virtually all maize production is from smallholders.

South Africa has by far the most developed commercial farming sector, which accounts for 98% of maize production, but larger commercial farms also provide at least 10% to 20% of market volume in such countries as Zambia and Botswana. The numbers of large commercial farmers in SADC who make a significant impact on maize production is restricted to South Africa and to a lesser degree to Zambia and Zimbabwe.

Table 9: Average Farm Size in Hectare of Subsistence and Commercial Farmers

Country	Subsistence size in ha	Commercial size in ha
Angola	1.5	> 50
Botswana	*7*	*575.2*
DRC	Unknown	Unknown
Lesotho	1	1.6
Malawi	1	10
Mozambique	1.3	23.5
Namibia	1.2	94.2
South Africa	Unknown	380[6]
Swaziland	0.9	1.8
Tanzania	1.6	0
Zambia	8.9	162
Zimbabwe	3.6	262.5

Source: Aphlis, 2010

Table 10 provides an overview of land utilization in nine key SADC countries (excluding South Africa), between commercial and smallholder land. These characteristics capture data for many products (not just maize) which can differ by level of intensity. For instance, Namibia has many very large farms but these are primarily extensive production for beef (ranches). Other than South Africa, there are few mega farms in the region concentrating on cereals production though Zambia has an increasing population of larger farmers. In Zimbabwe, large commercial farms were significant 20 years ago but their numbers have been greatly reduced through land evictions.

[6] According to Jayne (2010) this figure is 380 hectares for South Africa

Table 10: Land Utilization by Smallholders and Commercial Farmers per SADC Country

Country	Population	Smallholders	Commercial
Botswana	1.9 million 42% rural 58% urban	5% suitable for cultivation 63 000 devoted for land fed	112 farms>150ha Commercial farms <1% of all farms, 8% of land area, 40% of cereals and pulses
DRC	64 million Urban agriculture 66% urban; 34% rural	10% classified as agricultural 59% as forested 61% of population engaged in agriculture	None
Malawi	14.3 million 81% rural; 19% urban	2 million<1ha 69% held by small farmers 85% cultivatable<1 ha 70% maize	30% farms are >10-500ha – focus cash crops – tobacco 13% cultivatable land held by estates (1.2m ha)
Mozambique	Agriculture 62% of land 21.7 million 63.2% rural; 36.8% urban	90% (3 million) cultivate rain fed land 63% concentrate on staple food crops (maize, pigeon peas, cassava)	10% (100 000 ha) commercial farmers on large concessions (focus on sugar cane)
Madagascar	19.1 million 70.5% rural; 29.5% urban Agric 70% Arable 5.1%	0.5 ha to 1.8 ha (average1 ha) for smallholder 40% healthiest households irrigate ½ of their Maize, cassava , rice	None
Namibia	2.1 million 63.2% rural; 36.8% rural	1% arable land 1.5 mill smallholders	4 000 commercial Average 7 200 ha (extensive grazing)
Tanzania	42.5 million 74.5% rural; 25.5% urban 38.8% agricultural land; 1.5 million ha maize	80% of rural in agric 4.9 million small scale with 1-3 ha.	Limited commercial farming
Zambia	12.6 million	82% of households with	2 000 large scale farmers

	64.6% rural; 36.4% urban Agriculture land 34.6%: 57% as forest	<5 ha 1.1 million smallholders cultivate 1 ha per household 44,000 medium size farmers (5-20 Ha) Cassava, maize, cotton, flowers	cultivate >20 ha
Zimbabwe	12.5 million 62.7% rural; 37.3% urban	1 million smallholders on 16.0 million ha in 199; many unregistered currently; shortages Communal areas 42% of land – supporting 4,3 million – 72% of rural population	Major land reform 400 commercial farms left (2009); 4660 on 11.2 million ha in 1988.

Source: USAID, 2010

These different types of producers typically produce for the different market segments identified in section 2, as highlighted below in Table 11. This provides a rough but informed reflection and perspective of the relative nature of small and commercial farmers in the maize value chain, with a predominant focus on human consumption. This also has implications on their level of competitiveness as little value addition takes place outside of South Africa (this includes Zambia).

Table 11: Major Structural Differences among Most Important Maize Producing SADC Countries

	South Africa	Botswana	Angola	Malawi	Zambia	Mozambique	Tanzania
Organization of Production							
Significant Commercial Farm Sector	High	Low	Low	Nil	Low	Low	Low
Large Smallholder Sector	Low	High	High	High	High	High	High
Development of End Markets							
Human Consumption	High	High	High	High	High	High	High

Animal Feed	High	Low	Nil	Nil	Low	Low	Low
Industrial Uses	Medium	Nil	Nil	Nil	Low	Nil	Low

Source: Authors

Smallholder supply response is constrained by farm structure: over half of the small farms in the region are less than one hectare in size. One-quarter of the farms are less than 0.5 hectares in size (Jayne et al, 2003). These farms cannot earn a viable livelihood through a maize commercialization strategy unless there is significant growth in maize productivity, which will require sustained and dedicated investment in crop science and extension.

Small farm strategies are changing. There is limited potential for area expansion for small farmers in most of the region, especially in the fertile zones. Hence, without land redistribution and/or substantial maize productivity growth, the gradual movement toward smaller farm sizes will compel households to adopt more diversified commercialization strategies capable of maximizing the value of output per scarce unit of land. In highly land-constrained areas, it should not be surprising to find households shifting out of relatively low-value maize toward horticulture, tobacco, cotton and niche crops, and then using the revenue to buy their staple food needs. There is evidence to suggest that this is already happening at least for a subset of smallholder farmers in the region.

3.3. Variability in maize yield and prices

The level of variability in the different countries is illustrated by the coefficient of variance (CV) in Table 12 below. The higher the levels of variance, the more important risk mitigation strategies become to stabilize the market.

Table 12: Variability in Maize Yields and Prices around Trend in Major Maize Producing Countries

Country and Region	CV OF Yield * %	CV of producer price %
Africa – Maize		
Ethiopia	14.5	23.2
Ghana	7.2	37.6
Kenya	11.1	19.5
Malawi	32.9	39.3
Mozambique	23.8	22.0
Nigeria	6.5	20.6
South Africa	20.3	28.6
Tanzania	11.2	Na

Uganda	8.2	Na
Zambia	30.6	Na
Zimbabwe	40.9	Na

From this table, we see that the four highlighted SADC countries (aside from South Africa) have the highest CV of yield and some of the highest CV of prices which adds tremendous uncertainty to both the levels of production as well as the prices received by farmers.

3.4. Expansion of production in SADC: New varieties

An important dimension to improved production per hectare is tied to the introduction of new maize varieties. The table below illustrates the level of adoption since 1996 between Eastern and Southern Africa. This table highlights the relatively low levels of adoption of new varieties, in particular hybrids, in the region. Zambia and Zimbabwe stand out as adopters (though much of Zimbabwe's production infrastructure has been decimated, reducing the impact of use of improved varieties), yet only Zambia is really improving its overall productivity.

Table 13: Adoption of Improved Maize Varieties (% Of Maize Area) in Eastern and Southern Africa

	2006				1996				1990		
	Improved OPV	Hybrid	Modern maize	Adjusted for saved seed	Improved OPV	Hybrid	Modern maize		Improved OPV	Hybrid	Modern maize
Eastern Africa	7	26	33	37	6	26	32		15	25	40
Ethiopia	5	14	19	21	3	5	8		16	5	21
Kenya	4	68	72	74	9	62	71		8	62	70
Tanzania	6	12	18	22	2	2	4		12	6	18
Uganda	21	14	35	54	4	4	9		50	10	60
Southern Africa	9	29	38	52	4	22	26		6	42	48
Angola	4	1	5	10	11	0	11		--	--	--
Malawi	15	7	22	50	1	13	14	(37)	3	11	14
Mozambique	10	1	11	22	9	0	9		17	1	18
Zambia	4	69	73	81	1	22	23		5	72	77
Zimbabwe	6	74	80	93	0	82	82		0	96	96
Eastern and Southern Africa	10	25	35	44	4	23	28		10	33	43

Source: Langyintuo et al. (2008), Hassan et al. (2001), Lopez-Pereira and Morris (1994).
Note: Langyintuo et al. (2008) adjust the actual seed sales in 2006/7 by improved OPV sales in previous two seasons for adjusted adoption rate.
For both sources, improved OPV and hybrid rates are calculated as percent of seed sales. Hassan et al. include Tanzania in Southern Africa, and also include Lesotho (71%) and Swaziland (78%), but exclude South Africa (96%). Including South Africa, they calculate that the adoption rate for Southern Africa in 1996 is 47% and 43% for Eastern and Southern Africa. No data are reported for Angola in 1990. The second figure for Malawi is estimated by Smale and Phiri (1997) based on official area estimates. Seed sales estimates are lower.

Source: Smale *et.al.* 2011

Genetically Modified (GMO) maize is still a sensitive topic in many countries despite its potential to increase productivity. Only South Africa actively produces GMO maize. Given the restrictions on GMO in the other countries, South Africa has difficulty selling it into the region and needs to divert its sales of GMO into countries outside of Southern Africa.

4. THE MAIZE TRADE

4.1. World market

World maize market conditions affect the regional value chain through two specific levers: (a) through its influence on South African exports to the rest of the world (as demand increases and prices rise, South Africa will export more to international markets); and (b) through its influence on imports to the region (prices that countries need to pay to cover food shortfalls).

Figure 4 provides a brief snapshot of the world market for maize prices (based on United States (US) Freight on Board (FOB) prices) over the past five years and shows major swings in the global price. It has doubled since 2006, with major price spikes in 2007 and 2011. This price instability (and volatility) has a major impact on the perceptions of the countries which are heavily dependent on maize for their food security, affecting their internal policy decisions to lead to more protective approaches.

Figure 4: Maize (US) Prices, no. 2, yellow, f.o.b. US Gulf ports, 2006 – 2011 (Source Mongabay.com)

Globally, it is expected that the demand for maize will grow over the next decade and that the composition of the demand will change. Overall, the level of human consumption will decline while the level of animal feed and industrial consumption will increase, especially for biofuels.

4.2. Regional Trade of Maize trade in SADC countries

In SADC, it is expected that the demand for maize will grow slowly over the decade, but that the composition of the demand will change. The level of human consumption will decline while the level of animal feed and industrial usage will increase. It is also expected that, as disposable income increases, consumer preferences will change in favor of more value-added non-maize related food. Even so, maize will remain the mainstay food crop in the region for the majority of the consumers. Overall, though, we have seen a trend in

SADC for higher levels of consumption of animal feed, especially for broiler production. There is an increasing level of both formal and informal trade of maize inside the region.

Table 14 highlights the net position of the major target countries for SATH. Half of the target countries are in perennial deficit positions and only three of the countries have regular surpluses. Ironically, both Zambia and Malawi, which have surpluses, also have export bans in place, only allowing exports under special conditions. Therefore, within the region, only South Africa is positioned to meet the needs of the deficit countries.

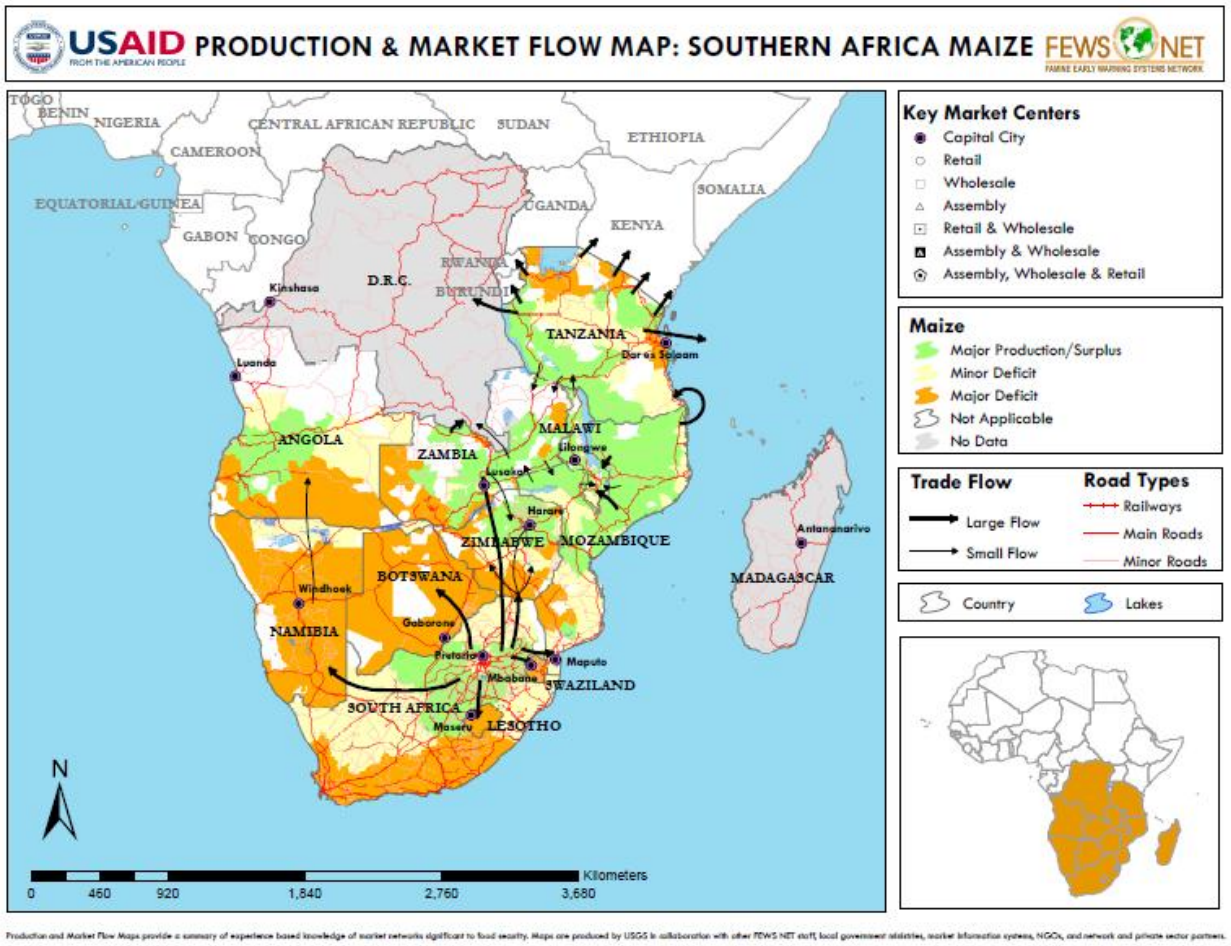
Table 14: Net Position of Focal Countries

	Actual					**Estimated**		
Country	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Angola	-	(58)	200	(50)	(50)	(113)	(219)	(335)
Botswana	(128)	(141)	(268)	(183)	(167)	(172)	(198)	(228)
Malawi (est.)	903	738	1,058	957	1,021	936	958	995
Mozambique	(220)	(66)	10	32	(220)	(200)	(234)	(317)
Namibia	(64)	(81)	(115)	(115)	(115)	(125)	(108)	(113)
South Africa	(713)	(691)	4,551	3,902	4,444	2,760	2,762	2,978
Zambia	225	116	(4)	189	800	800	990	1,007
Zimbabwe	(150)	(700)	(600)	(275)	(200)	50	96	140
Regional totals	(147)	(883)	4,832	4,457	5,513	3,936	4,047	4,127

Source BMI USDA: Business Monitor International Country reports Southern Africa Agribusiness Report Q1 2012 (extracted from USDA Table 1, data from SAGIS and CEC)

Formal and informal exports and imports of maize do play a significant role in the larger SADC countries. A production and market flow of Southern African maize is given in Figure 5 below which highlights the importance of South African production and its trade into the region.

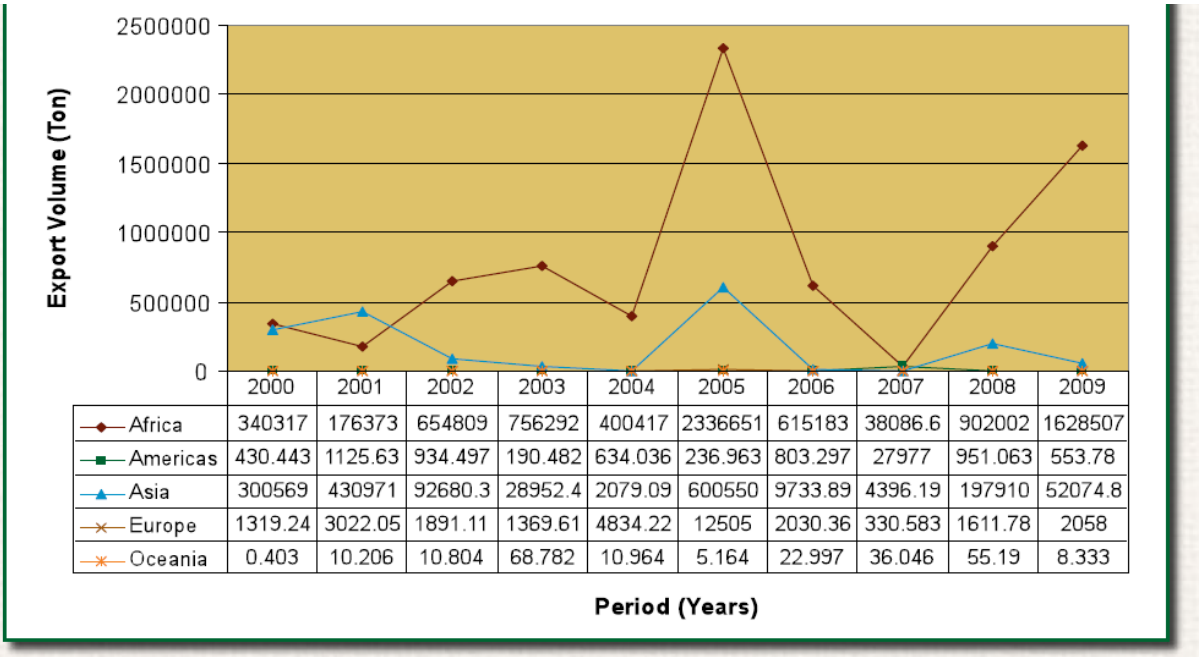
Figure 5: Production and Market Flow Map: Southern Africa Maize



Source: FEWS NET

South Africa's exports for the period 2000 to 2009 is given in Figure 6 below and demonstrates its major role in meeting shortfalls in the region. Zimbabwe has been the main export destination of maize from South Africa into the SADC region during that period (460,000 metric tons (mt) in 2008 and 272,000 mt in 2009). However, with South Africa's large surpluses in the past two years, most of the exports have gone to Kenya (1.1 million mt in 2009) and to Asia in 2010 (358,000 mt to Korea and 99,000 tons to Japan, and 95,000 mt to Indonesia). Over the last five years, Mozambique has been a regular importer (between 70-95,000 mt per annum).

Figure 6: Volumes of Maize Exports from South Africa to Various Regions



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Africa	340317	176373	654809	756292	400417	2336651	615183	38086.6	902002	1628507
Americas	430.443	1125.63	934.497	190.482	634.036	236.963	803.297	27977	951.063	553.78
Asia	300569	430971	92680.3	28952.4	2079.09	600550	9733.89	4396.19	197910	52074.8
Europe	1319.24	3022.05	1891.11	1369.61	4834.22	12505	2030.36	330.583	1611.78	2058
Oceania	0.403	10.206	10.804	68.782	10.964	5.164	22.997	36.046	55.19	8.333

Source: Quantec Easy Data

The other two countries with national surpluses and formal maize exports, Zambia and Malawi, have both concentrated their formal exports to Zimbabwe, usually through official marketing channels.

Informal trade

While the formal trade statistics are an important resource for understanding the dynamics, there is a substantial amount of informal cross border trade in the region. In Southern Africa, the Famine Early Warning System Network (FEWSNET) monitors cross-border trade. They currently monitor 29 border points in the region and report on trade that is unrecorded because it is carried out without any formal documentation, or is considered negligible so as not to require formal permits and other documentation. The volumes reported in Table 15 end up being quite substantial in many cases, especially considering the total amounts of maize traded between the countries. They only report on maize, rice and beans, with maize meal converted into grain equivalents. More recently, a separate analysis has been included to show the proportion of maize meal compared to maize grain. This is a recent addition to the data and shows that maize meal is around 10% of the maize total by weight.

Table 15: Informal Cross-Border Food Trade, July 2004-July 2010 (Mt)

	Maize		Rice		Beans	
	Exports	**Imports**	**Exports**	**Imports**	**Exports**	**Imports**
Malawi	31,319	**511,718**	14,596	**9,489**	**3,182**	**33,760**
Mozambique	421,137	12,588	12,503	1,486	20,531	1,427
RSA	8,321		699		531	270
Tanzania	130,193	16,958	4,875	5,954	19,207	434
DRC		75,214		47,577		32,262
Zambia	130,518	50,879	54,039	9,653	33,674	6,585
Zimbabwe	1,452	55,583	185	12,739		2,388
TOTALS	**722,941**	**722,941**	**86,898**	**86,898**	**77,125**	**77,125**

Source: FEWS NET Southern Africa, Phumzile Mdladla personal communication

Table 16 provides a comparison between the assessed informal trade in these products as shown above and the official reported data from the FAO database for maize, rice and beans. These are indicative only, as the years overlap somewhat and the definition may not be directly comparable. Nonetheless, if the FEWSNET data is indeed not recorded, then in some instances the informal trade is significant.

Table 16: A Comparison between Formal and Informal Trade, 2005-2007 (Mt)

	Exports			Imports		
Maize	**FAO**	**In-formal**	**Rela-tionship**	**FAO**	**Informal**	**Proportion (%)**
Malawi	392,882	5,550	1%	189,288	312,201	165%
Mozambique	123,264	223,251	181%	446,150	1,160	0
RSA	2,825,335	1,737	0%			
Tanzania	209,568	112,921	54%	346,809	4,609	1%
DRC	263		na	56,906	22,481	40%
Zambia	100,167	39,179	39%	178,752	25,150	14%

Zimbabwe	1,277	379	30%	940,663	17,416	2%
Maize tot	3,652,756	383,017	10%	2,158,568	383,017	18%

Source: FAO database and FEWS data, Tralac Analysis, 2011

The table highlights the fact that Malawi imports a significant amount of maize and Mozambique's balance of trade evens out a lot more given the significant net informal exports of maize. However, when South Africa is removed from the equation, informal exports increase to 46% of the total of formal exports, while only accounting for 18% of imports. Therefore, informal exports account for about one third of the total exports of maize from the other countries in the region.

5. POLICY AND REGULATORY ENVIRONMENT FOR MAIZE

The policy environment affects the maize trade in myriad ways. First is the general policy and investment climate which affects all products, but which can have an especially large impact on maize as the most important agricultural crop in the region. Second are the maize-specific policies which are often being implemented on a national level; as the most important food crop in Southern Africa with a large number of small producers, maize is a highly politically sensitive crop in many countries, subjecting it to specific national policies which can restrict the flow of maize throughout the region.

5.1. The Overall Trade Framework

Southern Africa includes countries which are members of three different regional economic communities (RECs) – the Common Market for Eastern and Southern Africa (COMESA), SADC and the East African Community (EAC) – with many countries being members of more than one REC. An important barrier to trade is the great degree of overlap of membership and in each country's application of the rules associated to each REC. The lack of harmonization of customs and documentation requirements between the countries and the three RECs creates uncertainty and confusion for traders regarding the import procedures and documentation to use when exporting costs if the incorrect procedures and documents are used.

5.2. Non-Tariff Barriers Affecting Trade in SADC

As tariff barriers have decreased, the importance and prevalence of non-tariff barriers (NTBs) have increased. NTBs are measures including domestic regulations or administrative procedures imposed for various reasons, including ensuring food safety, product safety and addressing environmental issues which can affect and distort the trade of goods, services and factors of production, leading the price at the border to differ from the domestic price. The following items represent some of those generic NTBs affecting the trade of maize in the region.

Quantitative NTBs and similar restrictions

Trade permits, export taxes, import licenses and bans are still prolific in the SADC region, which limits the opportunity for regional sourcing and trade of maize products, adds to the time needed to ship maize and greatly increases the cost of doing business.

Customs procedures and administrative requirements

Inefficiencies in customs procedures, including delays at road checks, borders, cumbersome administrative requirements for rules or origin certificates and variations in border operating times have been identified as significant barriers to trade.

Technical barriers to trade

The standards regime in SADC can be classified as being too reliant on mandatory inspections and certifications, national standards and testing requirements and overlapping responsible authorities. Efforts have been made to harmonize standards in a regional SADC regime, but there is still a lack of application by all member countries. Currently, only Namibia and Swaziland have adopted all 78 SADC standards for the region.

Various member countries require cumbersome pre-shipment inspections and stringent Sanitary and Phytosanitary (SPS) certification requirements for the importation of different agricultural products. There is also a lack of clarity and information regarding the authorities responsible for issuing and processing SADC certificates of origin in member states.

Lack of physical infrastructure

Seven countries in SADC are landlocked - Botswana, Lesotho, Malawi, Swaziland, Zambia and Zimbabwe. As a result, road and rail transport networks become essential for the transportation of products throughout the region. However, high transaction costs due to inadequate and unreliable transport infrastructure in most member states results in inefficient rail and road transportation.

Various ports in the member countries are unable to handle containers exceeding six meters, which dramatically limits exporters using the most cost-effective way to transport large volumes of goods throughout the region. Road networks in Malawi are not maintained, thereby increasing transport costs and time delays for products transported through the country.

5.3. NTBs Relating Specifically to Maize in SADC

Moving beyond the generic trade barriers, a wide range of NTBs in the SADC region are applicable to the import and export of various agricultural products including maize. TRALAC (2011) identified the following barriers affecting regional trade in agricultural products including maize.

Table 17: NTB in SADC region

NTB	Products affected
Import bans, quotas and levies	Wheat, poultry, flour, meat, **maize**, sugar, eggs, pork and fruit & vegetables
Import permits and levies	Eggs, fruit & vegetables, livestock and **maize**
Single marketing channels	Wheat, meat, dairy, **maize** and sugar
Rules of origin	Palm oil and wheat flour, seeds (for maize)
Export taxes	Dried beans, live animals, sugar, **maize**, meat and coffee
Standards	Milk, meat, **maize**, bran, cotton cake, poultry, sugar, coffee and ostriches

Source: Tralac, 2011

5.4. Examples of Regulatory and Institutional Issues in SADC Affecting the Maize Industry

The participation of national governments, parastatals and monopolies in the trading systems is also prevalent in many SADC member states. This includes the operation of borders and ports by government parastatals, local content requirements for the protection of domestic industries and trading of specific goods by government monopolies.

In Zambia, the exportation of maize can only take place through single channel marketing, while the importation of maize in Zimbabwe takes place via state trading government monopolies. The Botswana government has a local content requirement for the production of grains (maize and sorghum) prior to import permits being issued. The government trade restricting measure is a 40:60 procurement rule: grain processors need to produce at least 40% of their maize and sorghum domestically before an import permit will be awarded for the remaining 60%. In addition, Zambia also charges a levy of 5%, in addition to value-added tax, on all agricultural imports from all other SADC members.

Regulations around the origin of maize seed and transhipment present another example of inefficiency. If seed produced in one country is shipped to a second country for storage, and re-shipped to its final destination, new certificates of origin need to be issued.

In Malawi, the government's setting of floor prices for a variety of crops, including maize, created disincentives for the efficient marketing of the products. The policy was designed to protect farmers, by giving them a "fair price". However, because the country was in surplus due to the subsidized fertilizer program, the high price dictated by the government prevented large (regulated) traders from being able to officially purchase the maize. This led to a disruption in the formal marketing of maize and the fragmentation of purchasing by a host of small traders who purchased at below the legal price, leading to greater inefficiency.

The role played by the government controlled Food Reserve Agencies (FRA) in each of the countries, though designed with the best of intentions, can also be distortionary. On the buying side, as the FRAs need to purchase new reserves each year, they often purchase at politically established prices rather than at market prices distorting local incentives and often times establishing opportunities for arbitrage. On the selling side, as the FRAs need to sell off old stocks (if they have not been required to address food security issues), they can dump them on the market, artificially pushing down prices.

In a six country study, Chapoto and Jayne (2009) found that the two countries most aggressively pursuing price stabilization through marketing board and trade controls over the 1994-2009 period (Zambia and Malawi) experienced by far the highest degree of maize price instability. Such findings indicate that many governments' well-meaning attempts to stabilize prices have actually destabilized them.

5.5. Conclusion on impacts of trade and regulatory environment on maize trade

NTBs and local regulations governing imports and exports, as well as local price floors and subsidies play a major role in the development of the maize sector in individual countries within the region, impacting regional trade in SADC. Private trade and investment develops more slowly and more tentatively in countries where government policy is particularly unpredictable. Stimulating the development of the maize value chain in the region will need more consistent and coherent policy approaches across the region.

6. THE STRUCTURE OF THE MAIZE VALUE CHAIN IN SOUTHERN AFRICA

While the specific structure of the maize value chain varies greatly by country within SADC, the overall components and actors are very similar. Increasingly, there is opportunity for the strongest actors in one country to get involved in the operations of the value chain in another. This requires an understanding of the different functions within the value chain, the actors at each functional level and their roles within each country and the relationships between the actors. Different channels, linking different types of actors, using different technologies and serving different markets will emerge. These allow differentiation of the way different market systems are operating within the region, the trends in growth of the value chain and the factors driving that growth. Only with a firm understanding of what the structure looks like in each country, the nature of the supporting environment at the meso- and macro-levels and how and why things are changing can we identify the commonalities across the countries and identify the most appropriate interventions for SATH.

6.1. The Major Functions and Actors Within the Value Chain

As with most agricultural value chains, the main functions in the maize value chain start with input supply, moving onto production, harvesting, postharvest handling, storage, marketing, processing and consumption. Each of these functions is carried out by different types of actors, using different types of technologies and interacting with different participants in the value chain:

- The key inputs for efficient maize production are good seed, fertilizers, crop protection products and water. These often come from interconnected market systems (i.e. separate value chains such as seed supply, fertilizers) with their own segmentation of

end users (i.e. small farmers, large farmers) and their own business models. Input suppliers have their own distribution channels and strategies via which they sell their products to the end consumers.

- Production is carried out by farmers with different sized farms (from 0.5 hectare (ha) to thousands of ha) using different types of technology (from hand hoe to large tractors and combine harvesters), applying different levels of inputs and with significantly different yields. These different producers have different objectives, as well, either for primary consumption or for commercial sale.
- Storage can take place on farm, in privately owned and managed warehouses, in publicly owned storage sites often managed by government (food reserve) or parastatal agencies. The technologies and management relations will vary by type of storage.
- Marketing (or trading) can take place at multiple levels in the value chain depending on the degree to which channels are fragmented. The trading function of buying and selling can start with small traders collecting small amounts from each farmer to on-sell to a wholesaler or direct sales from large farmers to exporters. The types of transactions and the roles of each type of trader are dictated by the clients they serve.
- Processing is the final step in the value chain before marketing. This step also has a broad array of technologies and interrelationships. The processing might target direct maize meal consumption (the simplest, but most predominant use) or animal feed, where the maize is mixed with other products to produce compound feeds or maize-based prepared products.
- The end markets for maize are varied – split between direct consumption of maize flour or finished manufactured products. The map leaves off the end market for biofuels as, for all intents and purposes, it does not currently exist in the region, though it could in the distant future.

All of these areas should be understood as they affect the behavior of firms and will identify points of leverage which will indicate the most effective areas for SATH to interact with the value chains. When analyzing the value chain from a regional perspective, we must also take into consideration that each country is different and that size and structures of the industry vary by country.

6.2. Supporting services

In addition to the direct functions within the value chain, supporting services are required for the system to function efficiently. These supporting services can be represented by interconnected value chains, such as equipment and input supply (each of which has its own value chain), pure services (such management services to operate storage silos or extension services to provide advice to the farmers) or financial services (including investment capital, working capital, or insurance) which cut across each function of the value chain. Many of the supporting services may be imbedded in the functions of a supplier of another input - for instance seed or input suppliers have a strong incentive to carry out farmer awareness and extension services to increase the sale of their products.

Commodity exchanges, where the product can be transparently traded, are an important service within the value chain though at present poorly developed outside of South Africa. Initiatives over the past decade to operationalize the African Commodity Exchange (ACE)

in Malawi and the Zambian Agricultural Commodity Exchange (ZAMACE) have had some success in streamlining purchasing but have not yet reached effective sustainability. The latter requires getting a critical mass of buyers to want to purchase from the exchange and generate efficiencies from centralized and transparent purchasing rather than using alternative supply channels to purchase directly. This is also tied to the nature of the supply of product to the exchanges, its reliability and consistency (ability to meet standards).

While storage is one of the main functions within the value chain, the storage businesses often act as service providers, never taking actual ownership of the product, but holding, treating and guaranteeing the presence of the product for the owners until they sell it. Effective storage facilities with adequate management which are able to guarantee the quality and integrity of the product can become a strong force for formalizing the commercial transactions relating to maize trade. It affects both the marketing and production services: good storage can provide financial institutions with confidence in the collateral provided (maize in storage) and allow them to lend against it to improve farmers' access to finance at the harvest stage (to pay off their production debts); and good storage can also guarantee to buyers that they are getting a consistent product in the volume and quality desired. Therefore, better overall storage systems can help with more efficient marketing of the product between the producers and processors and provide a better link to finance.

6.3. The relationships – horizontal and vertical coordination

The relationships between the different actors within the value chain and the governance structures that manage the relationships are critical to developing efficient channels to get product grown and marketed.

Horizontal coordination. At the production level, cooperatives play a critical role in establishing horizontal coordination (relationships between actors at a specific functional level). Effective horizontal coordination at the producer level can lead to increases in productivity and builds stronger relationships with the other actors operating upstream and downstream from the producers. Upstream, they can help farmers access inputs at lower prices and access new technologies. Downstream they can help to identify better markets, increase negotiating power to get better and more consistent prices through contract arrangements and provide internal governance to ensure that these contracts are met. Good horizontal coordination also allows the producers to engage more effectively with policy makers, giving them a voice in the policy dialogue, as well as providing more solidarity and access to needed external services. Farmers unions, such as Grain South Africa, the National Smallholder Farmers Association of Malawi (NASFAM) and the Southern African Confederation of African Unions (SACAU), provide apex institutions to group all the farmers unions in the region.

Vertical coordination. Vertical relationships are those between the actors at each functional level. These relationships often dictate the nature of the marketing channel. When there are good relationships, driven by strong actors (lead firms) who are directing the overall channel, it becomes much easier to access the range of services that are needed to create an efficient value chain. The lead firms have the relationships with the supporting service providers and are able to convince them to invest; they also have closer ties to the end markets and are able to communicate needs to the producers on varieties, quality standards and timing of delivery to meet the market requirements. As the

lead firms increase their integration into other functions within the value chain, it becomes easier for them to control the access to services for the smaller producers in the system.

6.4. The Actors

The actors and their characteristics vary for each function and differ greatly across the countries, especially when comparing South Africa to the rest of SADC.

Producers

At the production level we find four distinct types of farmers – the subsistence farmer, the surplus farmer, the emerging commercial farmer and the full commercial farmer, as described above.

However, it is extremely important to note that maize producers are highly differentiated, even among the small farmers. As an example, Jayne et al found that, in Malawi, 1-2% of households accounted for 50% of the marketed maize (the emerging commercial farmers) while 16-18% of households accounted for the other 50 % of marketed maize, depending on the year. At the same time, about 80% of the farm households did not sell any maize, so out of a total maize production of between 2-2.5 million mt, only about 500-600,000 mt were actually marketed. Of the marketed maize, up to 75% came from small farmers, with the remaining 25% from estate (large commercial) farmers. In Zambia, a limited large commercial farming sector contributes significantly to the marketed maize but total production is dominated by smallholders. Meanwhile, Mozambique has a smaller volume of commercially produced maize with a significant amount coming from smallholders.

Traders/collectors

At the trading level, there are several actors in the value chain which collect maize from the deepest rural areas and then aggregate it to meet the needs of large processors, FRAs and international buyers (including Non-Governmental Organizations (NGOs), the World Food Program (WFP), etc.).

At the base of the informal channels are the small traders (often working from bicycles, motorcycles or small trucks) who collect small quantities at the farm level and are able to get deep into the rural areas. They provide a steady market to farmers who want to sell, though perhaps not always at a price that the farmers would prefer. The small traders are quite geographically focused and bring it to the medium and large traders.

Medium-sized traders might handle 500-2,000 tons per annum, and sell to large traders who would handle much larger quantities (large traders would include the Food Reserve Agencies, parastatals such as Malawi's Agricultural Development and Marketing Corporation (ADMARC), large private trading companies that handle exports) or directly to processors and feed mills. These medium traders often own their own transport systems (large trucks), though might be transporting directly to the storage points owned by the largest traders or processors.

The large traders purchase from medium traders or directly from the largest farmers and farmer associations to bulk and hold the maize. They sell to the millers and the larger traders who will handle exports, if any, as well as to the bulk grain markets where maize makes its way back to the villages, unmilled.

There can be strong links between the levels of traders. Many of the larger informal traders may have a network of their own dedicated collectors who buy for them. The larger traders may also have direct purchasing relationships for some of the larger millers and processors. Generally, the relationships between the traders and the producers are market driven and opportunistic, with the traders trying to purchase at the lowest price in order to maximize their profit margins.

The more formal traders will often combine storage with the purchasing and collection of the crop. The most organized of these traders are also integrating backwards into production or forwards into processing. On the backwards linkages, they need supply to meet their market commitments so they enlist contract producers and then ensure that they have the resources necessary to produce (working capital to access available quality seed and inputs). On the forward linkages, they are integrating into milling (both for animal feed and/or for human consumption) so also need to guarantee their supply to meet contracts at the market level.

The MSU study on Market Sheds in 2008 identifies the international exporters (from South Africa) as major players who purchase just for export.[7] It is necessary to recognize the critical role of the FRAs in Malawi, Mozambique and Zambia as they are significant market actors. The National Food Reserve Agency (NFRA) in Malawi, the Zambia FRA and the Mozambique FRA all own silos and storage to hold grain in case of emergency. While they do not typically show up on the value chain map, the FRAs purchase grains and then hold them for a year or more before releasing them. Since the FRAs typically own the storage infrastructure, they also play a key role in managing and maintaining this storage infrastructure which is often the most important in a country.

The FRAs can also serve as a tool for government policy, as they can lead the purchasing of product at official prices - at least until their funding has been used up. While their role is extremely important in the context of food security, it can also lead to less efficiency in the value chain and distortions, especially when it is time for them to sell old stock.

Storage

The storage function is divided between different actors. On-farm storage by smallholders for their own consumption tends to dominate the overall volume stored in most countries, as less than half of production is actually marketed (except in South Africa). This brings with it all of the intrinsic problems that small farmers encounter with household storage. However, since this subsistence approach does not include much investment by the small farmers, it is difficult for SATH to interface with them.

Large traders and processors tend to dominate most of the storage of commercialized crop, though few have formal storage facilities. Across the region, the shortage of good warehousing stands out as a constraint in all discussions. Traders' storage facilities range from small go-downs (at the medium trader level) to storage in bags under tarps to use of more formal warehouses holding bagged maize to silos. The latter require significant investment and are rarely owned by traders, unless it is for export.

Agencies like the FRAs or parastatal marketing agencies (like ADMARC) tend to dominate the ownership of formal storage facilities (silos) which have required significant investment paid for by government. However, anecdotal evidence points to their often being used at

[7] Maize Market Sheds in East and Southern Africa, 2008

suboptimal levels (low capacity utilization) or with poor management, leading to high rates of spoilage. There is limited detailed information on the specific levels of capacity of utilization rate and so increased research is required in this area. In some cases, underutilized storage can be rented out to other organizations (large traders) to hold their maize for later sale.

Private processors typically have storage that fits their production requirements that is linked into their core business. If a greater quantity of reliable commercial storage was available, they might actually reduce their own storage requirements.

As the large South African cooperatives are entering other countries in the region, they are starting their investments at the storage level, which is an excellent point of leverage for them to aggregate and hold the commodities that they are purchasing. Their warehouse management skills provide them with a comparative advantage and can allow them to link it back to access to inventory finance.

The absence of commercially available storage as a service -- where producers or traders can lease out space to meet their current storage needs -- is a constraint to the effective functioning of the commercial marketing channels, affecting both the producers as well as the traders.

Processing actors

The dominant activity in maize processing is grinding it into maize meal. This can take place at small hammer mills which process an individual's daily or weekly household maize needs, or at large rolling mills which produce vast quantities of maize meal for commercial sale. Processing also includes finished food products and animal feed.

Hammer (grist) mills operate at the village or neighborhood level and usually grind maize for a service fee. While many of the small grist mills (with capacity of up to a few tons per day) are pure service providers, some of them are also purchasing maize to hold, then process and sell when the time is ripe.

Large flour mills. The large milling companies dominate the maize meal industry, providing the bulk and (often) retail packaged maize meal. They are integrated into all milling operations, including wheat, so maize is just one part of their overall business equation – important, but still just one piece of the equation.

Feed Mills. Feed mills can either be standalone mills, producing feed for commercial sale, or they can be linked into the animal fattening process, depending on location. The large feedlots for cattle in South Africa are often located close to the supply of maize and the feed mills are close by (also close to their main source of raw material).

For example, in Northern Mozambique, large poultry operators (more than 25,000 birds per week) are far from other feed mills and have expensive transport costs, Since they are in the maize zone, they are increasingly purchasing the raw materials locally (maize and soya) and carrying out their own local feed production on an industrial scale. This contrasts with their competitors in Southern Mozambique who purchase most of their feed, pre mixed, from South Africa because the shipping costs are so low for the industrial product from South Africa.

However, in cases where the poultry business is now producing feed, their core business is still poultry. Feed production is a necessary distraction and not their core business. As a result, they are not focused on the feed business and do not make the most efficient

utilization of their equipment. If the cost of transport of manufactured feed can be brought down to affordable levels, these processors might exit the business. However, for the time being, they are important market actors in their market areas.

AFMA, with more than 200 members in South Africa, is a key player on the horizontal coordination between the feed millers, and is seeking to expand its services into the region.

Food Processors. Food processing companies use maize as ingredients into other processed goods. They are sometimes linked to the milling operations, but maize is also just one ingredient (often not the most important) in their product line. However, as major players in the overall food industry in a small country, they may also be involved in trading maize as well.

6.5. The Channels

The maize value chain on the following page depicts the relationships between the different market actors within the value chain. Across the region, there are four main channels through which product flows from production to consumption: production for subsistence, surplus production, emerging commercial and formal commercial channels.

The subsistence channel dominates in the number of participants and, in many cases, in total volume of production. While the map in Figure 7 shows the range of possible relationships in each of the countries, the specific size of each channel will vary by country with differing overall flows of product. For instance, in South Africa, the commercial channel is very large and dominates the maize market. Meanwhile, in Malawi, most production actually takes place in the subsistence channel and never gets marketed; commercial production accounts for only a quarter of all marketed maize, while maize marketed from *surplus production* or *emerging commercial channels* divide the rest. In order to provide more differentiation between the most sophisticated market (South Africa, Figure 8) and the other countries, we are presenting a map for South Africa as developed by MSU which is focused primarily on permutations of the commercial channel.

Subsistence channel (channel 1). Some of the most critical actors outside South Africa are the subsistence farmers who carry out almost all of the functions themselves. They produce it, store it, then process it (grind it) themselves, either with very low technology (mortar and pestle), or have it ground at a local hammer mill for a small fee. Occasionally they will purchase additional maize or maize flour as their own stock dissipates. Often they will also sell some of their crop to meet immediate financial needs at the time of harvest. But the dominant characteristic in this channel is that while it accounts for a sizeable percentage of production in many of the countries (more than 50% in particular Malawi and Mozambique), almost none of it is actually traded. There can be quite high levels of post-harvest loss due to poor storage within this channel.

The *surplus production channel* (channel 2) is closely linked to the subsistence channel. In this case, the small farmers are producing primarily for their own consumption but at harvest have a surplus which is marketed in small quantities through local traders or sold to neighbors as they need cash.

Figure 7: Generic Maize Value Chain Map in Southern Africa

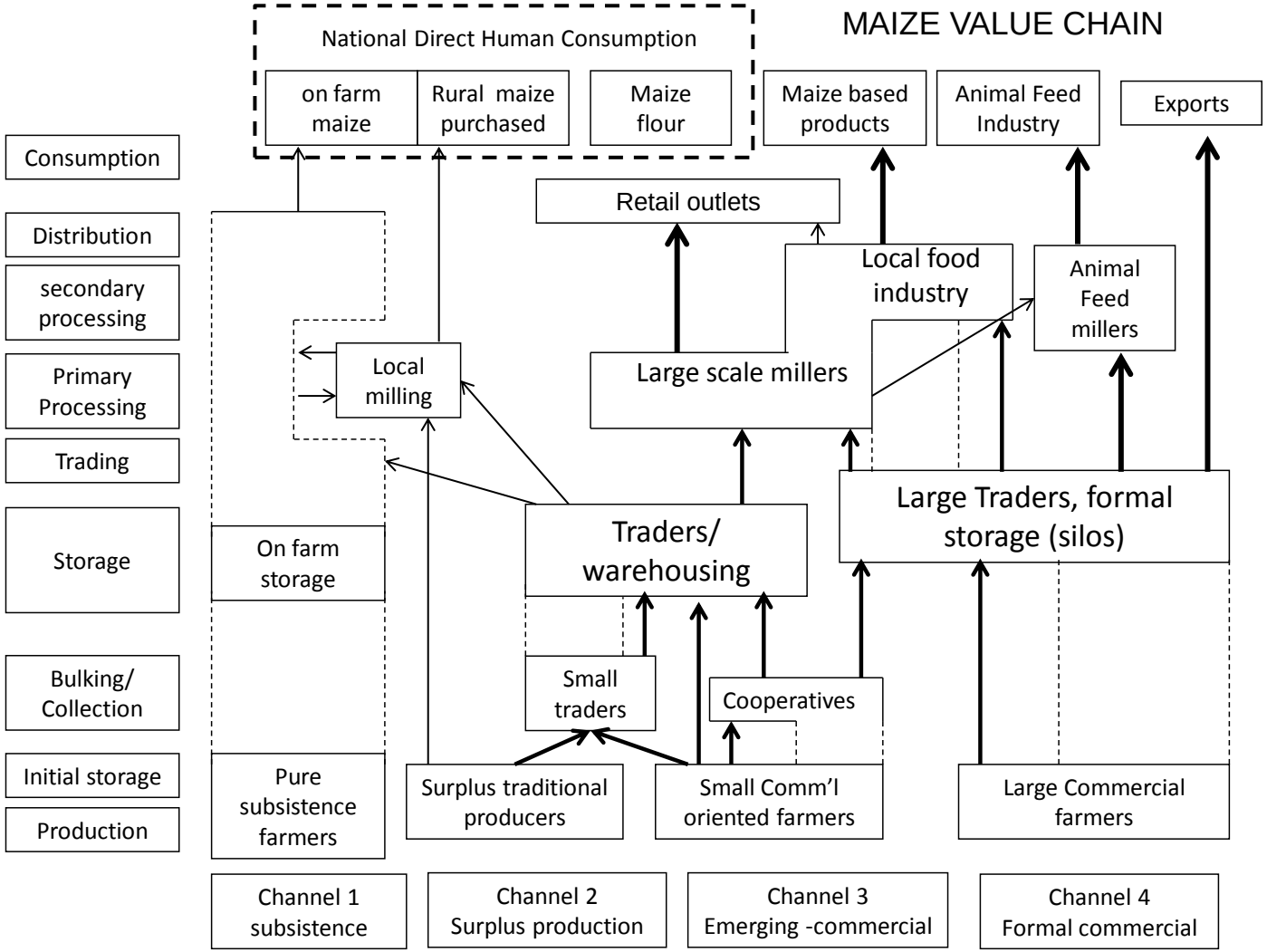
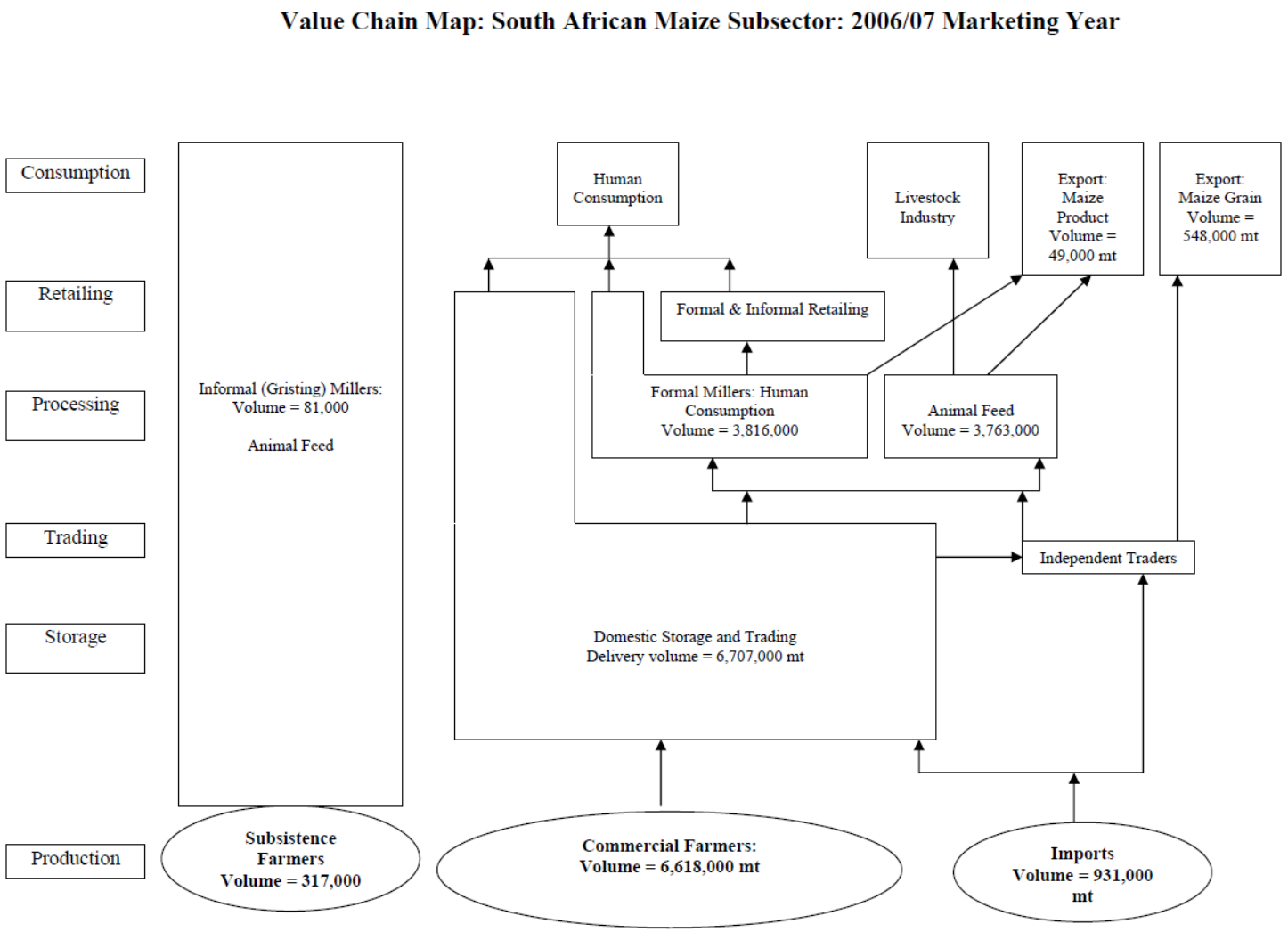


Figure 8: Maize Value Chain Map in South Africa



The *emerging commercial channel* (channel 3) is dominated at the production level by small- to medium-sized farmers who treat the production as a commercial crop and are planting it with a primary view to sell it. They represent a small percentage of the total population of farmers (1-2% in Malawi and Mozambique, while in Zambia a more significant percentage). These farmers are usually larger compared to their counterparts in channels 1 and 2. They are often organized into cooperative structures which provide them with various services, and aspire to be able to move into the formal commercial channel where they will be able to take advantage of the access to formal services.

The emerging commercial channel is highly dependent on the medium to large scale traders, many of whom are still trying to maximize their profits at the expense of the producers. The nascent cooperative structures are trying to balance the power relationship between the producers and the traders.

Channel 4 - Commercial channel. The commercial channel is formal and quite organized (see below) with sound vertical relationships between the farmers, the traders and the processors. It is increasingly characterized by the forward and backward integration of the actors at the storage, milling and processing levels. More contract production exists and they are able to maximize their profitability by taking advantage of their economies of scale and increased productivity.

Perhaps the biggest difference between channel 4 and the other channels is the access to the supporting services (finance, inputs, equipment) and institutional arrangements to stimulate improved marketing of the products(commodity exchanges, good infrastructure, access to storage facilities, grading and sorting, etc.).

6.6. Formalizing the Marketing Channels

This report characterizes three commercially oriented market channels to reflect the differentiation between the producer who has a regular surplus which is sold and the emerging commercial farmer who is growing to sell and the true commercial farmers. However, there are dominant characteristics separating the formal channel from the informal channels, they are poorly coordinated with each other. On the one hand, the formal marketing channels link commercial farmers (mainly in South Africa) and international suppliers to large grain trading, processing and retailing firms with subsidiary distribution networks throughout Southern Africa. This marketing system is characterized by the following (Jayne, et al 2010 in Sarris and Morrison):

1) Commodity exchanges, including futures and options markets, enabling farmers and marketing agents to reduce risks of current and future investments;
2) A network of integrated silos, millers and supermarket retailers, often with transnational firm ownership;
3) Market information accessible on a daily basis, some of which is public, and some which is proprietary, providing asymmetric information advantages for those willing to pay;
4) Large transaction volumes, which enables transaction costs to be spread over greater quantities traded, hence reducing per unit marketing costs;
5) Well-specified grades and standards to allow for remote contracting by commodity specification rather than by visual inspection;

6) Legal systems to accommodate more sophisticated contracting arrangements and facilitation of contract disputes; and
7) Organized lobbies representing firms widely perceived as having a legitimate interest and voice in the determination of regulations governing agricultural markets.

By contrast, the "informal" marketing systems in the region, on which most small-scale farmers rely, are generally characterized by:

1) Spot market transactions with weak mechanisms for market-based risk management;
2) Small percentages of production sold off the farm, resulting in relatively thin markets and high transaction costs per unit traded;
3) Weak road and communications infrastructure, resulting in high transport costs;
4) Weak information systems for reporting local market conditions;
5) Processing of maize, either at home by consumers, or by low-cost small-scale mills not integrated with other stages of marketing systems;
6) Limited coordination between input delivery, farm finance and crop sale, resulting in part from poorly functioning input credit systems; and
7) Small business with relatively little political influence or voice in the determination of regulations governing the agricultural section.

There are important implications from these differences in characteristics. The ability of small farmers (channels 2 and 3) to prosper and take advantage of the growth opportunities will depend on their being able to integrate into the more formal marketing channels (channel 4) where they exist. The problem is that outside of South Africa, the formal commercial channel (4) is very weak.

The challenge is to create the conditions within the most important producing countries to allow the emerging commercial farmers to benefit from the services which make the formal commercial channel more efficient. SATH's challenge is to identify the steps needed to be able to upgrade the firms that are currently operating in the more informal commercial channels and move them over to the commercial channel. This is not a simple process, but it will be an evolution, as each of the elements included in the formal channel are tackled and introduced into each country. Introducing the elements needed to lead to a more efficient channel cannot simply be "created", but must be developed to fit the needs of the market actors they will be supporting.

7. DYNAMICS AND DRIVING FORCES

An important part of the value chain analysis is to understand the dynamics within the industry – what has been changing between the different value chain channels and why. In South Africa, channel 4 has been dominant and will remain so. It is characterized by all seven of the elements listed above which make for a performing and efficient system. Ten years ago, Zimbabwe was in the same situation, but saw the collapse of the system and a reversion to channels 2 and 3 due to the governments' regulations on land tenure and farm seizures.

In other countries in the region, however, we are seeing a gradual increase in the formalization of the marketing channels and a determined shift for many producers to try to move towards channels 3 and 4.

7.1. Driving forces

A number of forces are responsible for driving the slow, but steady, development of channel 3 as it attempts to formalize. At the same time, there are a number of other factors which are holding back the development of a more efficient market system.

- **Lead Firms.** A very important force which is driving change are the large cooperatives from South Africa which are expanding into the region, and see the potential benefit in trying to upgrade the systems of the farmers in channels 2 and 3 to allow them participate more fully in the commercial channel. They are bringing sound management skills, improved access to inputs and more efficient management of the marketing channel, when they have an incentive to produce. Led by the major production cooperatives (AFGRI and Senwes, e.g.), the maize production/trading/financing sector will continue to push South African capital, technology and managerial capability out into the region.

  In order to expand their markets, farm equipment suppliers from the US and other countries are increasingly focused on meeting the demand for affordable mechanization solutions for emerging commercial farmers.

- **Economies of scale in production systems, driven by land size.** The more efficient production channels do depend on economies of scale which are most easily attained through larger sized farms. However, effective horizontal and vertical coordination can help to offset some of these shortcomings when they are well managed. Both land under production and economies of scale in maize production will be driven by new investments in commercial farming, especially in Mozambique and Zambia. These larger farms will take better advantage of mechanization, irrigation, improvements to transportation and warehousing, GMO technology and financing. The lead firms are often drivers of increased coordination, stimulating economies of scale.

- **International direct investment.** This is often tied closely to the lead firms and is linked to the interest by firms from other countries to find opportunities for investment in untapped markets as the opportunities for growth in their home countries begin to shrink. Private equity interest is expanding for African agriculture, making investments in production, processing and trading facilities.

- **World market for maize.** The steadily increasing price of maize, linked also to its high volatility in the world market, over the past few years has two effects. First, it is providing incentives for the private sector to invest in the sector and to incentivize the lead firms to move into new untapped markets, both to expand area under production, but also to invest in improving the efficiency of the value chain and enhancing productivity.

  At the same time, the high volatility is driving national governments to try to institute domestic policies to protect their consumers against the effects of the price fluctuations. The export bans are trying to prevent the creation of potential shortages, as private firms may respond to market incentives to sell stocks at a profit, even if it leads to a shortfall in national supply. This can have potentially negative impacts on incentives for firms to invest in the sector.

- **Government policies.** The host of government policies continues to have a negative impact on incentives to invest in the sector. They are holding back the complete commitment of outside investors in some countries, as noted above.

- Land tenure reform in Zimbabwe led to the reduction in efficiency and shrinking of channel 4 in that country. In South Africa, major land reform has already taken significant areas out of production, though it has not yet had a catastrophic impact as improved mitigation measures are being put in place.
- Implementation of export bans and price floors, as mentioned above, are arbitrary responses and create an erratic environment which can create disincentives to investment.

7.2. Advantages and disadvantages of growing maize

Given the current dynamics of the maize industry in SADC, it is necessary that the advantages and disadvantages of growing maize are considered to determine the real opportunities for growth.

The main advantage of growing maize in the region is that SADC (excluding South Africa) actually promotes maize production as part of a solution to poverty alleviation by means of the different subsidy/assistance schemes available for households. Current advantages are:

- The ability to produce sufficient quantities of maize to feed the family at costs which are lower than the market price of food staples and provide a cash surplus.
- Maize, as staple cereal in SADC, will always have a resale value – which can ensure a source of income even at subsistence levels of production.

Disadvantages of maize production are:

- Maize is a capital intensive crop when cultivated on a commercial basis. The cost of inputs and mechanization serves as a barrier to entry for existing small scale and new farmers.
- Theft is a reality as maize is a staple food. Excessive theft at levels of more than 10% forces maize producers to change to non-food crops.
- Animal damage (domestic) is prevalent in non-fenced rural areas and makes production unprofitable.
- Lack of infrastructural development denies producers access to markets and irrigation opportunities which will decrease the risk of dependence on rain.
- Risk of low prices due to government intervention which distorts normal price formation mechanisms.
- Lack of accredited storage facilities which would enable producers to store maize in order to capitalize on market opportunities (producers have to sell at minimum prices due to lack of accredited storage facilities) Lack of risk mitigation mechanisms such as multi - peril risk insurance or weather derivatives to mitigate the risk associated with rain fed maize production.

Table 17 provides a Strengths/Weaknesses/Opportunities and Threats (SWOT) analysis of primary maize production in the SADC region.

Table 178: SWOT Analyses of Primary Maize Production in SADC Region

Strengths	**Weaknesses**
Maize is the second largest agro – industry after poultry (broilers) in terms of revenue	Production is weather reliant and therefore subject to large variations between seasons
South African self sufficiency of staple food	Distortion of international grain markets mainly due to subsidies received in the international arena. SA has to compete without any subsidies
Food security for the Southern African region	Severe deterioration of research capacity and infrastructure and governmental extension services
Foreign exchange through exports	Barriers to entry at producer level due to high cost of land, equipment and input costs
The existence of a well- developed infrastructure	Export opportunities are mainly limited to Africa (RSA however has established international markets)
Skills and experience base within the industry	Subject to imported inflation due to reliance on imported goods (fertilizer, chemicals and mechanization). This results in high costs (production and maintenance)
Ability to multi crop with other cash crops	Low skills base of the emerging sector
	Risk mitigation mechanism use is low (e.g. price hedging)
	Lack of new innovative products in the industry
Opportunities	**Threats (South Africa country specific)**
Expansion of primary production into SADC countries	Land reform Green Paper which could limit farm size
Growth in the animal feed industry in Africa which creates an alternate use of maize other than the traditional human staple	Land restitution which decreases production capacity as the process is currently not successful in terms of sustainable production by new entrants
Production of biofuel from maize	Emigration of commercial farmers due to unfavorable legislative conditions in South

	Africa
Forward integration into export driven meat industry (with animal feed as basis) to Europe and Middle East	Exchange rate volatility and interest rate increases
Change in legislation in SADC which could allow the importation of GMO's	Deteriorating infrastructure with specific reference to rail which seriously hampers export opportunities
	Environmental pollution due to mining and industry. Mpumalanga and Free State Provinces are the most affected. The two provinces account for 60% of maize production in South Africa
	Threats (SADC specific)
	Smallholder farmer farm sizes decreasing to uneconomic levels
	Impact of non-tariff barriers on intra-regional trade
	Government intervention /involvement that creates uncertainty and impacts on private sector involvement

Source: Louw (et al), 2010

8. SATH'S MAIZE VISION AND STRATEGY

In the maize sector, SATH intends to increase productivity and therefore revenue throughout the value chain by addressing the operational issues facing the emerging commercial farmers. The strategy is to improve the access to needed inputs, services and markets by facilitating the introduction of the appropriate linkages and services between formal channel operators and small farmers. It recognizes that maize is the single most important crop in the region and that the elements required for maize are the same to increase productivity for all other crops.

The key point of leverage to achieve this is improved warehousing and storage. This will have significant flow through effects for maize and all other value chains. The principal activities will focus on:

- The facilitation of grain storage infrastructure and warehousing networks to provide better market opportunities; and,
- The implementation of warehouse receipt systems which can will allow farmers to time sales, engage in forward sales and access spot markets, including commodity exchanges.

The main partners for these activities will include the leading agricultural cooperatives and agribusinesses that are promoting increases in agricultural production as part of their business models, such as SENWES, AFGRI, Grain SA, Tiger Brands, Feed Manufacturers and their associations such as the Agribusiness Chamber (ABC) and AFMA, and local farmer associations at regional and national levels (e.g., SACAU, NASFAM and Farmers' Union in Malawi and the Zambia Farmers Union).

Starting with improved warehousing as the point of leverage will open opportunities to increase the overall efficiency of the value chain. It will reduce post-harvest losses, increase access to finance for smaller farmers through warehouse receipts programs, improve storage management and grading of maize, facilitate transportation linkages, especially bulk transport and improve farmer access to and cost of financial services.

8.1. SATH's Approach

As a private sector-oriented, trade development project, it is recommended that SATH focus on those activities which facilitate trade and investment leading to greater productivity by smallholder farmers. The approach should be to work primarily with private sector associations and service providers to build the capacity of local service providers, create linkages between providers and seekers of services, improve access to the latest technologies, introduce private sector models to improve the management of the value chain and increase access to finance, and seek opportunities to support outside foreign investment.

In policy advocacy work, SATH will focus primarily on empowering the private sector to advocate with national governments and the relevant RECs on those high priority constraints that will be realistically tractable in the life of the project. We will work with existing groups such as Agricultural Business Chamber and Grain SA, and explore the development of a regional organization such as the Southern African Grain Council.

As a regional project, SATH will focus largely on regional approaches. SATH will work in the context of other bilateral and regional USAID projects, such as Agrifuturo in Mozambique, the upcoming Integrating Nutrition in Value Chains (INVC) project in Malawi, and Africa LEAD regionally.

SATH's work in grain warehousing will not only have impact in the maize value chain, but will also be leveraged across other cash crops, such as soy, groundnuts and cotton, for which storage, transportation and crop financing are needed.

8.2. Recommended Activities to Strengthen the Maize Value Chain

1) Development of warehouse and storage networks

a) Facilitate the establishment of warehouse networks across the key maize-producing countries of Zambia, Malawi and Mozambique.

b) Assist to implement a warehouse receipt system in those same three countries which will increase demand for warehouse storage, increase the liquidity of the farmers, and build the basis for price risk management services.

c) Facilitate improvements in grain transportation and handling – especially bulk -- in the SADC region and market initiatives.

d) Encourage investment in commercial production, storage, transport and services.

e) Develop partnerships with both South African and US firms, industry associations, and government agencies involved in the maize value chain to help them extend trade, investment, and other services into SADC.

2) Improved access to production, marketing, and trade finance

a) Develop better information on opportunities in maize value chain investment (e.g. inventory/analysis of grain storage options in SADC). Organize buyer/seller missions and participation at major trade shows (e.g. NAMPO) that will bring greater access to markets, technology, and finance for producers.

b) Improve market price information services, and more price transparency, through support of commodity exchanges with a regional focus.

c) Promote development of yellow maize as commercial cash crop as a feedstock into animal feed.

3) Policy Advocacy

a) Work with both farmer groups and the Agricultural Business Council of South Africa to mobilize SADC-wide stakeholder support of policy measures to support trade and investment in maize production and marketing.

b) Encourage adoption of conventional and GMO certified maize seed.

Continued work on the cross border transport constraints that increase the cost of inputs and services into the region.

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It is evident from Jayne (2010) that the ending stocks for world maize should remain at levels that might be termed *barely adequate.* While in line with the past 20 years (16% of total utilization), carryovers abroad will be well below the past 20 years. Stock levels and ethanol prices should support maize prices above those prior to 2007, averaging between $3.30 and $3.80 per bushel. With general inflation, particularly with energy prices, variable costs will average about $260 per acre, about $80 above the previous decade. Even so, gross margins over variable costs per acre will hold at an elevated level both in nominal and real terms.

Area in coarse grain is also slated to expand in the rest of the world from about 275 million hectares in 2008 to 287 million in 2014, a 5% increase. Within increased yields, production could reach 831 million MT, more than a 7% increase. A 15% increase in the utilization of coarse grain for feed will be partly offset by a reduction in the utilization for food. Utilization of coarse grains for ethanol production is assumed to nearly double by 2014 but will represent only about 50% of U.S. output. Ending stocks would edge lower in terms of percentage utilization and remain well below the average of the past 20 years.

Table 19: Coarse Grain in the U.S. and the rest of the World, 2005 to 2008 and Projections to 2014

Item	Unit	Year 2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
United States											
Corn											
Harvested acreage	Mil. Acres	75.1	70.6	86.5	78.6	79.6	81.6	82.9	83.0	83.3	83.7
Yield	Bu./Acre	148	149	151	154	155	157	159	161	164	166
Production	Mil. Bu.	11114	10531	13038	12101	12321	12817	13199	13397	13632	13889
Coarse grain											
Production	Mil. MT	299	280	350	326	330	345	354	358	362	367
Utilization											
Feed	"	163	148	158	144	141	139	142	143	143	144
Ethanol	"	41	54	76	91	106	112	117	122	126	131
Other domestic	"	41	41	40	40	38	38	38	38	38	38
Exports	"	60	58	70	48	53	49	50	52	59	67
Total	"	305	301	352	303	337	338	347	354	367	379
Ending stocks	"	55	36	45	50	45	54	64	70	69	60
Corn											
Farm price	$/Bu.	2.00	3.04	4.20	3.90	3.81	3.60	3.38	3.34	3.39	3.52
Loan rate	"	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95
Target price	"	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63	2.63
Variable costs	$/Acre	186	206	230	301	245	239	247	259	273	288
Gross margin[1]	$/Acre	164	272	428	324	375	356	321	311	313	327
Rest of World											
Hectares	Mil.	267	272	277	273	279	283	285	285	286	287
Production	Mil. MT	679	708	729	774	754	778	793	805	818	831
Utilization											
Feed	Mil. MT	472	487	496	502	509	521	535	549	563	578
Food	"	274	286	289	300	257	260	263	266	269	272
Ethanol	"	28	36	37	47	47	51	56	60	65	70
Total	"	746	772	785	803	813	823	844	859	873	895
Ending stocks	"	110	102	112	129	121	122	119	114	115	116
Corn Prices and Determining Factors											
Corn prices at the Gulf											
No. 2 Yellow	$/Bu.	2.69	3.94	5.53	4.38	4.29	4.08	3.86	3.85	3.93	4.11
No. 2 White[2]	"	2.82	4.70	5.77	4.80	4.64	4.43	4.22	4.22	4.31	4.50
Ending stocks as a % of utilization											
U.S.	%	18	12	13	16	13	16	18	20	19	16
Rest of world	%	15	13	14	16	15	15	14	13	13	13
Ethanol price[3]	$/Gal.	1.80	2.58	2.24	2.47	1.84	1.89	1.89	1.96	2.01	2.06

[1] Over variable costs [2] Derived from prices at Kansas City, MO [3] F.O.B. Omaha, NE.

Table 20: SADC: Maize Balance Sheet: Marketing Year (Vary by Country) 2011/2012
Thousands of Metric Tons

	Ang	Bot	Les	Mal	Mau	Moz	Nam	RSA	Swa	Tan	Zam	Zim	SADC
A. Domestic Availability	599	28	76	3945	7	2403	71	13509	101	4284	3869	1822	30709
A.1 Opening Stocks	8	18	24	50	2	224	17	2336	16	161	849	370	4074
Formal/SGR	6	17	19	40	2	150	17	2336	12	90	849	270	3807
On Farm	2	0	6	10	0	74	0	0	4	71	0	100	267
Other	0	1	0	0	0	0	0	0	0	0	0	0	1
A.2 Gross Harvest	591	10	52	3895	2	2179	54	11173	85	4123	3020	1452	26634
B. Gross Domestic Requirements	1486	161	252	2617	86	2059	156	10520	131	4545	1967	1837	25818
C. Desired SGR Carryover Stock	10	10	12	60	0	50	10	1108	2	150	240	505	2157
D. Domestic Shortfall/Surplus	-897	-144	-188	1268	-82	294	-96	1881	-33	-411	1662	-521	2733
E. Commodity Cross Substitution	0	0	0	0	0	0	0	0	0	411	0	0	411
F. Imports	0	160	60	0	0	122	107	0	0	34	0	0	483
F.1 Received	0	51	36	0	0	0	18	0	0	34	0	0	140
Commercial	0	51	36	0	0	0	18	0	0	34	0	0	140
Food Aid	0	0	0	0	0	0	0	0	0	0	0	0	0
F.2 Expected	0	109	24	0	0	122	89	0	0	0	0	0	343
Commercial	0	109	24	0	0	122	89	0	0	0	0	0	343
Food Aid	0	0	0	0	0	0	0	0	0	0	0	0	0
G. Exports	0	2	0	0	0	153	0	2070	0	0	0	0	2225
Committments Shipped	0	0	0	0	0	0	0	0	0	0	0	0	1
Committments Not Yet Ship	0	2	0	0	0	153	0	2070	0	0	0	0	2225
H. Import Gap	-897	0	-128	0	-82	0	0	-189	-33	0	0	-521	0
I. Forecasted Closing Stock	0	24	0	1328	0	313	21	919	0	184	1902	0	3559
J. Current Stock	0	10	8	0	0	0	0	0	0	90	0	0	108
K. Self-Sufficiency Ratio	*40*	*17*	*30*	*151*	*8*	*117*	*45*	*128*	*77*	*94*	*197*	*99*	*119*

Source: SADC Food Security Early Warning System, Monthly Update – 15 November 2011