



INTRODUCTION

A competitive seed sector is key to ensuring timely availability of high quality seeds of improved, appropriate varieties at affordable prices to smallholder farmers. This brief summarizes the key findings of The African Seed Access Index (TASAI) study conducted in 2015 and 2016 to appraise the structure and economic performance of Uganda’s seed sector. With a focus on four grain crops that are important to food security—maize, sorghum, beans and millet — the study evaluates the enabling environment for a vibrant formal seed sector and covers 19 indicators that are divided into the following categories: Research and Development, Industry Competitiveness, Seed Policy and Regulations, Institutional Support, and Service to Smallholder Farmers. To give perspective, this brief assesses the performance of Uganda’s seed industry over time, as a similar study was conducted in 2013. It also offers comparisons against Kenya’s seed industry, where similar studies were conducted in 2013 and 2016. Appendix 1 summarizes all 19 indicators across the two countries. The objective of TASAI is to encourage public policy makers and development agencies to create and maintain enabling environments that will accelerate the development of competitive seed systems serving smallholder farmers.

Overview

Like most other African countries, the seed industry in Uganda consists of two systems: the informal sector and the formal sector. This policy brief focuses almost exclusively on the formal seed sector.

The informal sector broadly refers to the system where farmers produce, obtain, maintain, develop and distribute seed resources, from one growing season to the next (FAO, 1998). Because of limited exposure, low availability of varieties, inability to purchase seeds, limited access to agro-dealers, or other reasons, most smallholder farmers in Uganda still rely at least in part on informal seed systems. In cases where the farmer is unable to retain part of the harvest, or where a farmer decides to plant a different variety, seed is generally acquired from the local community, including markets as well as farmers’ social networks. This is true particularly for crops other than maize. Standards in the informal seed systems are not monitored or controlled by government policies and regulations; rather, they are guided by indigenous knowledge and standards and by social structures.

The formal sector focuses on breeding and evaluating improved varieties and producing and selling seed of these varieties that is certified by the National Seed Certification Service (NSCS). NSCS is the government entity under the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) responsible for regulating Uganda’s seed industry. As shown in Table 1, Uganda’s formal seed sector comprises many institutions including government (e.g. NSCS, NARO, MAAIF, agro-dealers, seed companies, and county extension agents), private sector (MNCs and local seed companies), and development agents (NGOs and CBOs). Associations such as the Uganda Seed Trade Association (USTA) when active, also play an important role in information sharing and advancement of members’ interests.

Table 1: Role of key players in Uganda’s formal seed sector

ROLE	KEY PLAYERS
Research and breeding	NARO, NaCRRI and NaSARRI, CGAIR
Variety release & regulation	NSCS, MAAIF
Breeder and foundation seed production	NARO, NaCRRI, NaSARRI; local seed companies
Seed production	Seed companies; community organizations
Processing and packaging	Seed companies
Education, training, extension	Seed companies, extension agents, Farmers’ Organizations, NGOs, agro-dealers
Distribution and sales	Seed companies, rural agro-dealers; NGOs

Key Acronyms: AATF – Africa Agricultural Technology Foundation, CIMMYT – International Maize and Wheat Improvement Centre, ISTA – International Seed Testing Association, MAAIF – Ministry of Agriculture, Animal Industry and Fisheries, NaCRRI - National Crop Resources Research Institute (NaCRRI), NARO – National Agricultural Research Organization, NaSARRI - National Semi-Arid Resources Research Institute, NSCS – National Seed Certification Service, UNADA – Uganda National Agro-Dealers Association, USTA – Uganda Seed Traders Association.



Number of active breeders

For the four focus crops (maize, sorghum, beans and millet), in 2015, Uganda had only 12 breeders serving more than 3.95 million farming households. Of these, only one was from the private sector. This number is significantly lower than the 63 breeders reported in Kenya. Five out of the 12 breeders work on maize. The number of breeders for beans, millet, and sorghum combined has marginally increased from 5 in 2013 to 7 in 2015. Not surprisingly, on average in 2015, the seed companies in Uganda rated the adequacy of the breeders as very low (28%). This low score was influenced by low ratings for millet and sorghum and can be attributed to the acute shortage of seed breeders for all crops.

Varieties released in the last 3 years

A total of 22 varieties were released between 2013 and 2015 (7 in 2013, 8 in 2014, and 7 in 2015). This was marginally higher than the 19 varieties released between 2011 and 2013. Of the total 22 varieties released between 2013 and 2015, 19 were maize varieties and 3 were bean varieties. There were no sorghum or millet varieties released over this period. However, NARO was set to release several new sorghum varieties in 2016. The high number of maize varieties can be attributed to the high demand for maize by farmers. Still, the 22 releases in Uganda between 2013 and 2015 are significantly lower than the 80 releases in Kenya over the same period.

Availability of (basic) foundation seed

Seed companies obtained foundation seed (for the four crops) 47 times from 8 different sources. Notably, only two of the sources were private seed companies, while the rest were public sector entities, including national and international agricultural research institutions, and a governmental parastatal from a neighbouring country. Of the public institutions, NaCRRI (for maize and beans) and NASARRI (for sorghum and millet) are the main sources, accounting for 33 out of the 47 times that foundation seed was sourced by seed companies in 2015. Other public sources include CIMMYT, IITA, AATF, and CIAT, among others. On average, seed companies rated their satisfaction with the availability of foundation seed as “fair” at 52%. This is a slight increase in the rating of 43% in 2013. Though still low overall, this increase was most notable for millet (by 19%) and sorghum (by 15%). The companies’ increased level of satisfaction for sorghum was likely driven by the increase in the demand for sorghum varieties by the brewery industry. The crop rated highest in

2015 was maize (64%), while the lowest rating was given for millet (34%).

Average age of varieties sold

Seed companies in Uganda sold a total of 53 varieties of the four focus crops in 2015. Of these, maize and bean varieties accounted for 83%, underlining the dominance of both commodities among commonly purchased seeds in the country. In terms of the average age of the varieties sold, the youngest varieties were maize (6.4 years) and beans (9.9 years). Sorghum (14.5 years) and millet (22.7 years) varieties were considerably older. This confirms the already-observed fact that maize and beans receive considerably more attention from researchers than the other two crops. However, NARO is to release several new sorghum varieties. Importantly, Kenyan varieties, on average, are much younger than Ugandan varieties. Note that these are simple averages, and they are not weighted by volumes sold as this data is not available.

Percentage of varieties with climate-smart features

To be classified as climate-smart, a crop variety must meet at least one of two criteria – early maturing and tolerance to extreme weather conditions such as drought, flooding or frost. Most of the varieties – more than half of the maize (55%) varieties and half of the bean (56%) varieties sold in 2015 were bred with at least one of these characteristics. However, none of the sorghum or millet varieties have climate-smart features. This is probably because most of these varieties are quite old (more than 14 years) and have not been bred for climate-smart features.

INDUSTRY COMPETITIVENESS

Number of active seed companies

In 2015, there were 13 registered seed companies in Uganda that either produced or marketed the four crops. This was a slight reduction from 14 companies in 2013. All the companies produce/market bean seed, while 12 companies produce/market maize seed. In 2015, eight companies produced/market sorghum seed, while only two companies produced/market millet seed. In comparison, in Kenya a total of 22 companies produce/market the top four crops.

Time it takes to import/export seed

The main seed imports into Uganda are maize (from Kenya and Tanzania) and vegetable seeds (from Israel and Turkey). In 2015, the average length of time to import seed into Uganda was only 6 days, which was a significant reduction from the 48 days reported in 2013. The change



is attributed to improvements in customs procedures by the Uganda Revenue Authority (URA). Importantly, this improvement is reflected in a significant increase in the level of satisfaction reported by seed companies, up from 55% in 2013 to 71% in 2015. Importantly, this is considerably lower than the 38-day import process reported in Kenya.

The length of the export process has also decreased. Seed companies interviewed for this study reported that in 2015, it took an average number of 9 days to export seed, as compared to 18 days in 2013. Consequently, the level of satisfaction with the export process reported by seed companies has also gone up from 55% in 2013 to 65% in 2015. Ugandan seed companies export seeds for maize, beans, upland rice, sorghum, millet, and pigeon pea. The main destination for seed exports is South Sudan. The time (9 days) it takes to export seed from Uganda is lower than the 14-day duration to export seed from Kenya.

Market share of top seed companies

Seed sales for the top four crops have increased three-fold from 4,415 tons in 2012 to 14,900 tons in 2015. This is a significant increase over a short time, signaling a growing market. The number of seed companies has not changed significantly over this period. This implies a growth in the sales of the existing seed companies. The market shares for the top four companies producing maize, sorghum, beans and cowpeas are represented on bar graphs in Figure 1 below. The *Herfindahl-Hirschman* Index (a measure of industry competitiveness) is also given in Appendix 1 (the index ranges from near zero for perfect competition to 10,000 for pure monopoly). Both measurements show an industry that is dominated by a few large players.

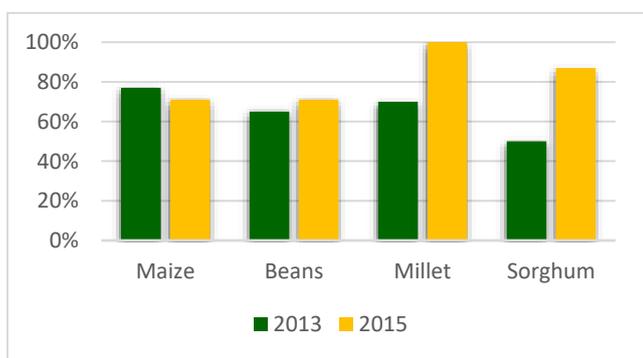


Figure 1: Market share (%) of top four companies.

In 2015, the aggregate market share of the top four companies was between 71% and 87%, except for millet, where there are only two seed companies producing/marketing millet seed. Except for millet, none of the seed companies controlled more than 40% of the market.

The market share of the top four companies has not changed significantly between 2013 and 2015. The only exception is sorghum, for which the share grew from 50% to 87% over the study period.

The HHI index shows a decline in competitiveness from 2013 to 2015 for all four crops. However, the market in Uganda is relatively more competitive over both study periods when compared to Kenya.

Market share of government parastatals

There is no government seed parastatal in Uganda. The seed sector in Uganda was liberalized and the former state-owned company, called Uganda Seeds Limited, was sold in 2005.

SEED POLICY AND REGULATIONS

Length of variety release process

In 2015, the average time it took to release a variety in Uganda was 19½ months. This is a reduction from the 33 months reported in 2013. The change is likely due to the fact that these varieties had already been released in another East African Community (EAC) partner state, and as such are allowed two (as opposed to 3) seasons of field evaluations and are exempt from the one season of Distinctness, Uniformity, and Stability (DUS) testing. Overall, the variety release process is much shorter than in Kenya, where it took an average of 36-months to bring a new variety to market in 2015. In Uganda, in 2015 seed companies and NSCS rated their satisfaction with the release of maize and beans varieties as “good” (60%), higher than their satisfaction with millet and sorghum varieties (45%). Note that 44 varieties of maize and beans were released between 2012 and 2015, while no sorghum or millet varieties were released over the same period.

Quality of seed policy

The Uganda National Seed policy is still in draft form. However, stakeholders have been actively engaging with the government to ensure that the policy reflects their views and priorities. Seed companies which were interviewed reported a slight increase in their level of satisfaction with the seed policy, up from 47% in 2013 to 52% in 2015. This reflects a sense of optimism from the seed companies attributed to the increased level of engagement with government. However, seed companies have suggested several areas for improvement including the need to fast-track the completion of the Seed Policy, the need to form a National Seed Board to advise the Minister



on all matters pertaining to the seed sector, and strengthening the human resource and logistical capacity of the National Seed Certification Service.

Quality of seed regulation and enforcement

The seed regulations are being harmonized to conform to the Common Market for Eastern and Southern Africa (COMESA) seed regulations. The Ministry of Agriculture, Animal Industry and Fisheries is holding consultations with stakeholders in a bid to finalize this process. Once adopted by the Ministry, the draft regulations will be submitted to the Solicitor General for legal drafting. Thereafter, the Minister of Agriculture submits the Regulations to cabinet for approval. Upon cabinet approval, the Regulations are gazetted and they become operational. The seed companies rated the quality and enforcement of the seed law as “fair” in both 2013 and 2015. This indicates that the National Seed Certification Service, the body in charge of enforcement, continues to face challenges. These challenges have been attributed to inadequate staffing levels and limited logistical support, which leave seed companies unsatisfied with the current enforcement system.

Adequacy of seed inspectors

One of the key challenges in Uganda’s seed sector is the low capacity at the National Seed Certification Service, the body mandated to conduct seed inspection services across the country. The number of seed inspectors at NSCS increased slightly, from 5 in 2013 to 6 in 2015. Not surprisingly, the average rating for seed inspectors was “fair” in both years. The interview findings reveal the opinion that, although individual seed inspectors try their best, they are simply too few to effectively implement their national mandate. The number of seed inspectors in Uganda is significantly lower than the number in Kenya.

The small number of seed inspectors and the low level of satisfaction both point to the need for more – and better-trained – seed inspectors in Uganda. An upcoming development in this regard is that local government extension services will be accredited to perform seed inspection; the accreditation will be provided by the Directorate of Agricultural Extension Services, which was formed in 2014. In addition, NGOs such as the Integrated Seed Sector Development (ISSD) Uganda are working closely with the District Agricultural Officers (DAOs) to improve the seed certification capacity at the district level. The hope is that these new arrangements will improve the quality and the quantity of available seed inspectors.

In addition, three private companies - Chemiphar Uganda Ltd. (Uganda), Ugacert Ltd. (Uganda), and Heartland Global (USA) – through a joint venture, have established a new company is called AgVerify Ltd. Each company is contributing staff and know-how to the joint venture. AgVerify provides seed certification, verification and internal quality management systems and procedures for seed companies, and plans to seek accreditation from MAAIF for field inspections. AgVerify has already established an ISTA-accredited laboratory.

Efforts to stamp out fake seed

Fake seeds have been recognized as a significant problem by the Ugandan government, but the TASAI study has found that seed companies are not yet satisfied with the government’s efforts to stamp out fake seed from the market. In fact, the average satisfaction score of 37% reported by companies in 2015 has declined from the 2013 figure of 41%. The main sources of fake seed highlighted by respondents are unscrupulous retail outlets, stockists, and contract growers, all of whom may replace – or inflate – genuine seed with grain. In 2015, Kenyan seed companies also rated their government’s efforts to stamp out fake seed as “fair”. However, the Kenyan regulator has since adopted labels placed on each bag of certified seed. The labels contain a scratch code, which customers can send to a designated number by text message to verify whether the seed they have purchased is certified.

INSTITUTIONAL SUPPORT

Availability of extension services

The ratio of extension agents to agricultural households has declined significantly from 1:3,140 in 2013 to 1:4,019 in 2015. This reduction is due to the restructuring of the government extension program, known as the National Agricultural Advisory Services (NAADS), in July 2014. Prior to restructuring, NAADs had recruited extension workers at district and county level across the country. Because of the restructuring process, a significant number of these positions were eliminated. By contrast the ratio is significantly higher than in Kenya, where there is one extension worker for every 910 farmers.

Quality of national seed trade association

Twelve out of the 13 seed companies interviewed are currently members of the Uganda Seed Trade Association (USTA), while the remaining company is planning to join the association. In USTA’s 16-year existence, membership has grown slowly: at present, of the 27 registered seed



companies in the country only 14 are members of the association. The 13 seed companies surveyed rated the overall quality of USTA as “fair” in 2015. The overall rating has declined from 61% in 2013 to 51% in 2015. This drop is attributed to lower scores for managerial ability and democracy in elections and decision-making. The ratings in all the other areas are nearly the same over the period 2013 to 2015. Figure 2 presents a breakdown of the seed companies’ evaluation of USTA in 2013 and 2015.

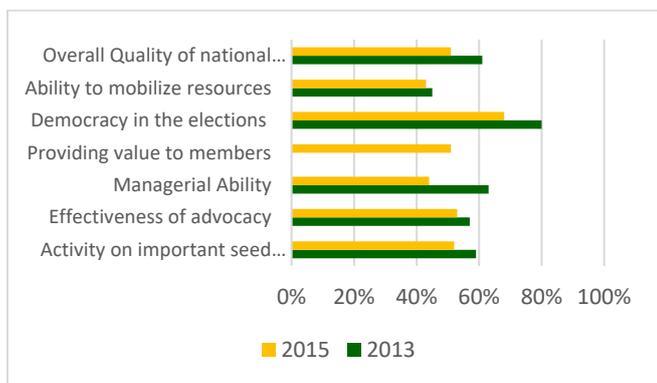


Figure 2: Members' satisfaction with USTA (%).

There were several important developments over the period that may have affected USTA’s performance rating. First, before 2013, USTA employed three seed inspectors to carry out field crop inspections. However, they all left due to a lack of financial resources to support the positions. Second, the USTA Executive Secretary left his position in 2014, and a new officer was recruited the following year.

SERVICE TO SMALLHOLDER FARMERS

Concentration of rural agro-dealer network

Agro-dealers are a key player in the seed distribution network. Based on the data collected by the 2015 survey, the number of agro—dealers has declined from 2,064 in 2013 to 1,167 in 2015. However, it is important to note that the 2013 data are based on a census of agro-dealers conducted in 2009. The 2009 census counted both licensed and unlicensed agro-dealers. However, in 2015, the survey recorded only the licensed agro-dealers. This explains the drastic reduction.

Availability of seed in small packages

Buying seed in small packages is preferred by many smallholders who cannot afford large, expensive bags of seed. Ugandan seed companies do not cater to this consumer need very well yet. On average, only 27% of seed for the four crops, is sold in packages of 2 kg or less. By contrast, in Kenya, 79% of the seed is sold in small packages. However, it is important not to overlook the variation in package sizes

by crop. One third (32%) of the maize seed sold by the seed companies is sold in packages of 2kg or less, compared to 73% in Kenya. Only 3% of bean seed sold by the Ugandan seed companies is sold in packages of 2kg or less, compared to 100% by Kenyan seed companies. Most of the millet seed in Uganda (75%) is sold in small packages, while only 20% of the sorghum seed is sold in small packages. The vast differences in availability of small packages between the two countries partially reflect the average farm size that are small in Kenya.

Seed-to-grain price ratio

Seed-to-grain price ratios denote two aspects of seed systems, given a uniform grain price: first, the extent to which a crop variety is improved, as reflected in the costs of seed production, and second, the costs of transacting in the seed market (Nagarajan & Smale, 2005). In other words, a high ratio (implying a high seed price) either denotes a high-yielding seed or high transaction costs. Hybrid maize, which is high-yielding, has the highest ratio (of 6). The ratios for all the other seeds range between 1.7 (for millet) and 3 (for OPV maize). This is quite similar to ratios in Kenya of 4.5 (hybrid maize) and 3.7 (OPV maize). Ratios of at least 5 are considered high enough to incentivize adoption of improved seed. This implies that the price of seed may not be a major constraint to the adoption of certified seeds.

CHALLENGES AND OPPORTUNITIES

The seed companies interviewed for this study highlighted several challenges affecting the seed industry in Uganda. First is the persistence of fake seed which was mentioned as a top threat by 8 out of 13 companies. Second is climate change as manifested by erratic rains, floods, and prolonged droughts which result in both production disruptions and market fluctuations. Procurement of seed by government for free distribution to farmers distorts market dynamics and negatively impacts the seed distribution networks. Erratic seed demand in the country, tied to grain prices, was reported by several companies as adversely affecting their businesses. The challenges notwithstanding, companies also noted several opportunities in the seed industry. There is increased demand for improved seed in neighbouring South Sudan. This is a new market, mainly for relief seed. Uganda continues to have high demand for seeds from government programs and NGOs. Moreover, there is increased interest by donors in supporting the seed industry all the way from research to marketing.



CONCLUSIONS

It has been more than one decade since the government seed company was sold in Uganda. Since then, the seed industry has experienced significant growth in terms of number of active seed companies and the production and sale of certified seed. The seed industry in Uganda is in the growth stage, as evidenced by the three-fold increase in seed sales between 2012 and 2016. These sales are driven by the high demand in both local and export markets. Efforts to harmonize seed legislation and regulation are beginning to bear fruit, and this is evidenced by the significant reductions in time taken to import and export seed. Further, non-state actors are working closely with government to address some of the structural and regulatory challenges in the seed industry. These efforts need to be encouraged and sustained.

However, the seed industry still faces significant challenges. The low capacity of the regulatory agency continues to constrain regulatory efforts. In addition, the government has not responded effectively to the growing challenge of fake seed, at the different stages of the seed value chain. There is need for greater collaboration between the

private sector and other actors to increase the number and capacity of the agro-dealer network across the country, as well as the agricultural extension service. With respect to research and development, the significantly low number of breeders (less than one fifth the number in Kenya) has constrained the industry's capacity to produce varieties for all crops. Government and companies should be encouraged to increase investments in variety development.

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APPENDIX 1. UGANDA'S FORMAL SEED SECTOR, COMPARED TO KENYA

COUNTRY PROFILE			KENYA		UGANDA	
			2013	2015	2013	2015
Focus crop 1			Maize	Maize	Maize	Maize
Focus crop 2			Sorghum	Sorghum	Sorghum	Sorghum
Focus crop 3			Beans	Beans	Beans	Beans
Focus crop 4			Cowpeas	Cowpeas	Millet	Millet
Number of farmers (millions)			6.3	6.4	8.8	9.1
Population (Million)			43	44	34.6	35.6
Size (KM ²)			569,250	569,250	197,100	197,100
Arable land (Million Ha) (% of size)			4.89	4.89	5.3	5.3
Ease of Doing Business rank (Rank out of 189)			136	108	150	122
Stage of seed sector development			Growth	Growth	Growth	Growth
A. RESEARCH AND DEVELOPMENT						
1	Number of active breeders	Total	68	63	11	12
		Satisfaction Score (out of 100)	--	54	36	28
2	Varieties released in last 3 years	Total	60	80	19	22
3	Availability of foundation seed	Score	61	60	43	52
4	Average age of varieties sold (years)	Maize	-	1	-	6.4
		Sorghum	-	10	-	14.5
		Beans	-	1	-	9.9
		Cowpeas	-	2	-	-
		Millet	-	-	-	22.7
5	Percent of varieties sold with climate-smart features	Maize	-	50.8%	-	55%
		Sorghum	-	100%	-	0%
		Beans	-	35.7%	-	56%
		Cowpeas	-	100%	-	-
		Millet	-	-	-	0%
B. INDUSTRY COMPETITIVENESS						
6	Number of active crop seed companies for focus crop only	Total	21	22	14	13
7	Time it takes to import/export seed from neighboring countries (days)	Import seed	26	38	48	6
		Import score (out of 100)	59	50	55	71
		Export seed	12	14	18	9
		Export score (out of 100)	--	69	--	65
8	Market share concentration Herfindahl-Hirschman Index	Maize	6,450	5,438	1,509	1,317
		Sorghum	1,989	4,576	1,050	2,483
		Beans	3,223	2,472	950	1,269
		Cowpeas	3,240	3,505	-	-
		Millet	-	-	1,350	6,401
9	Market share of government parastatal	% mkt share	72%	67%	0	0
C. SEED POLICY AND REGULATIONS						
10	Length of variety release process	Time (months)	37	33	37	19.5
		Score (out of 100)	33	47	56	60
11	Quality of seed policy framework	Score (out of 100)	65	62	47	52
12	Quality of seed law / regulations	Score (out of 100)	61	63	44	55
	Quality of enforcement systems	Score (out of 100)	53	61	41	42
13	Adequacy of seed inspectors	Total inspectors	60	64	4	6
		Score (out of 100)	64	62	44	40
14	Efforts to stamp out fake seed	Reported cases in 1 year	36	6	--	--
		Score (out of 100)	37	50	41	37
D. INSTITUTIONAL SUPPORT						
15	Availability of extension services for smallholder farmers	Ratio to farmers	1:1000	1:910	1:3140	1:4,019
16	Quality of national seed trade association	Score (out of 100)	65	62	61	51



		KENYA		UGANDA		
E. SERVICE TO SMALLHOLDER FARMERS		2013	2015	2013	2015	
17	Concentration of rural agro-dealers	Number of agro-dealers	--	5,240	2,064	1,167
18	Availability of seed in small packages	% volume sold	89	79	29.1	27
19	Seed-to-grain price ratio at planting time	Maize (OPV)	-	3.7	-	3
		Maize (Hybrid)	-	4.5	-	6
		Sorghum	-	3	-	2.3
		Beans	-	1.8	-	1.6
		Cowpeas	-	1.5	-	-
		Millet	-	-	-	1.7

Key

Score (out of 100)	80 to 100	60 to 79.99	40 to 59.99	20 to 39.99	0 to 19.99
Color Code					
Interpretation	Excellent	Good	Fair	Poor	Extremely poor
H-4 Index	<1000	1000-1999	2000-2999	3000 - 3999	>4000

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