ANALYSIS OF SALES AND PROFITABILITY WITHIN THE SEED SECTOR

Independent Report prepared for:

Co-chairs of the Ad-hoc Open-ended Working Group to enhance the functioning of the Multilateral System of Access and Benefit-sharing of FAO's International Treaty on Plant Genetic Resources for Food and Agriculture

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ANALYSIS ON SALES AND PROFITABILITY WITHIN THE SEED SECTOR:

INDEPENDENT REPORT BY IHS MARKIT (PHILLIPS MCDOUGALL) FOR THE CO-CHAIRS OF THE AD-HOC OPEN-ENDED WORKING GROUP TO ENHANCE THE FUNCTIONING OF THE MULTILATERAL SYSTEM OF FAO'S INTERNATIONAL TREATY ON PLANT GENETIC RESOURCES FOR FOOD AND AGRICULTURE

Report submitted:	4th November 2019
Report prepared for:	**Co-chairs of the Ad-hoc Open-ended Working Group to enhance the functioning of the Multilateral System of Access and Benefit-sharing of FAO's International Treaty on Plant Genetic Resources for Food and Agriculture**
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Introduction

Background

This study was commissioned by the Co-chairs of the Ad-hoc Open-ended Working Group to enhance the functioning of the Multilateral System of Access and Benefit-sharing of FAO's International Treaty on Plant Genetic Resources for Food and Agriculture. The Co-chairs of the Working Group have indicated the importance of having data and information available about sales and profitability within the seed sector at global level, especially in the context of defining monetary benefit-sharing in the revised Standard Material Transfer Agreement (SMTA) of the Multilateral System. The Co-chairs therefore sought input from experts on recent trends in both areas. Phillips McDougall have been analysing and reporting on the seed sector for over 20 years and was commissioned to prepare this independent report.

There are hundreds, if not thousands of seed companies in the world, the vast majority of which are small, often family-owned businesses. The focus of this Report is on the top 40 or so companies who account for around 85% of the total market and are classified as Tier 1 >$500m sales) and Tier 2 ($100-500m sales) companies. All smaller companies were classified as Tier 3.

Specifically, the project objectives were to:

- Characterise the industry in terms of the range and distribution of companies in as a function of their sales
- Delve into industry profitability as far as possible. Outside the leading companies most companies do not report profit
- Distinguish between crops as far as possible in terms of profitability

This report is the final piece of a project which started in April 2019. Two presentations have already been made to various Members and stakeholders from the Working Group. The presentation made in June is available at the webpage of the International Treaty.[1] The purpose of this report is to validate or otherwise the initial conclusions on the basis of work subsequently conducted and developed further.[2]

[1] http://www.fao.org/plant-treaty/meetings/meetings-detail/en/c/1106601/

[2] Some countries party to the International Treaty requested information on public institutions involved in the seed sector. However Phillips McDougall does not track these and it was not possible to collect this information within the timeframe of this project. In the opinion of the author it would be difficult to find information on sales of such institutions, and in any case it is likely that any such sales would be small. In order to extract maximum value from its seed any organisation would need to be involved in both the multiplication of the seed and its distribution, and these are not primary functions of international public seed organisations. Whilst local public seed organisations might be engaged in production and distribution of seeds their markets are likely to be confined mainly to the countries in which they operate, and therefore relatively small.

Methodology

The Phillips McDougall Seed Service was used as a major source for data on the overall seed market and Tier1 and many Tier 2 companies. Although not published in the Phillips McDougall Seed Service, information on the sales and profit of other Tier 2 and Tier 3 seed companies is regularly obtained from annual reports, submissions to Company Houses where available and other ad-hoc sources. Where sales data is not typically available, but manpower numbers are, we generally use the latter to estimate company sales. As a rule of thumb, company sales per employee lie in the range $100,000-200,000.

Each company reports differently reflecting its:

- Ownership – listed companies report more.
- Home country – reporting requirements vary.
- Degree of specialisation – e.g. BASF being a diversified company didn't give much detail on seed sales. At the other extreme KWS and Vilmorin being specialised seed companies report sales and profitability by crop group. So did Monsanto before it was acquired by Bayer.

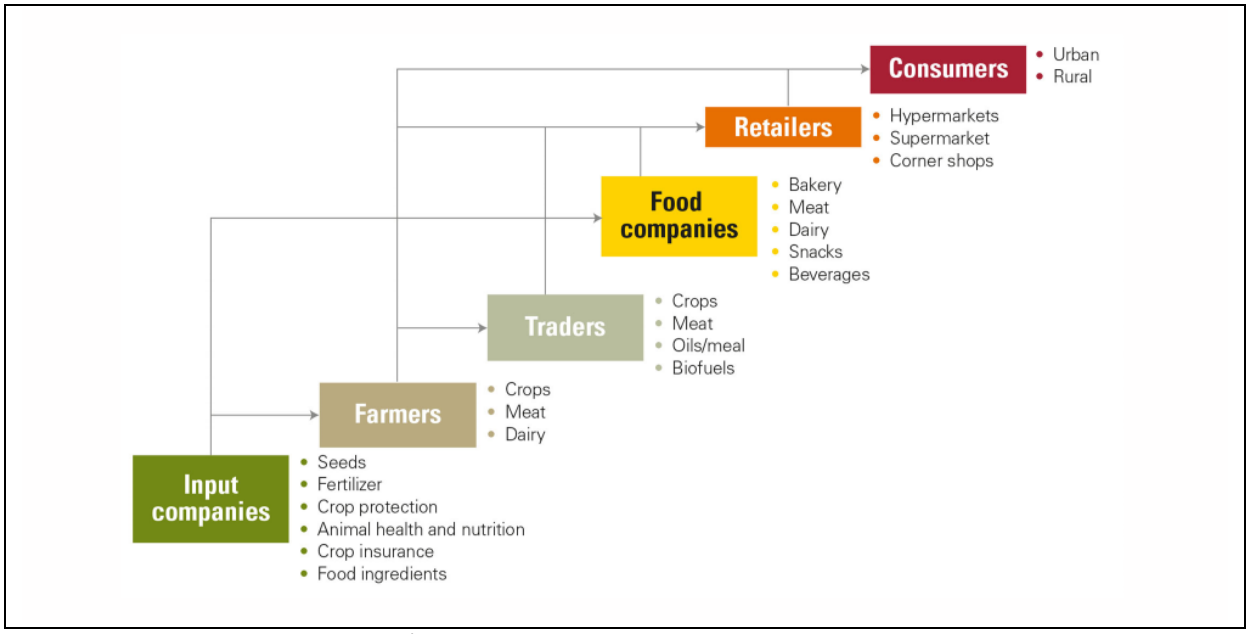
2. Global seed market

2.1 Size and composition

To set the scene and put the company analysis in perspective, a brief review of the global seed industry is first presented.

The seed industry lies at the beginning of the agri-food value chain as part of the input sector, along with fertilizers and crop protection products (Figure 1). As well as being the subject of the specific laws and regulations which pertain to the sector itself, it is also subject to the various influences and requirements of the downstream players and ultimately the consumer. Any seed company must take into consideration these requirements when developing new varieties or traits (Persley and Anthony, 2017).

Figure 1: The Agri-food value chain



Source: KPMG 2013; Phillips McDougall/IHS Markit

Some key metrics for each part of the value chain are shown in Table 1.

Most of the R&D in the agri-food chain is invested in the inputs sector, particularly crop protection and seeds, and of this the majority goes into seeds. This is reflected in the relatively high profitability for the sector, which will be explored in more detail later in this paper.

Table 1: Metrics at different stages in the agri-food chain

Sector	Input	Farmers	Traders	Food companies	Retailers
Sales: US$bn (approx.)	400	3,000	1,000	3,500	5,400
Number of players	1,000s	450 million	Tens	Thousands	Millions
EBIT[3] % sales	15%	Variable	2-5%	10-20%	5%
R&D % sales	<1% (fertilizers) 15% (seeds)	0%	<1%	1-2%	<1%
R&D Spend: $bn	10	-	Low	8	Low
Composition/sub-sectors	Seed, Fertilizer, Crop protection, Machinery, Animal health and nutrition, Crop insurance, Food ingredients, Digital farming.	Grains, Fruit and vegetables, Meat, Dairy.	Handling, Primary processing, Secondary processing.	Bakery, Meat, Dairy, Snacks, Ready meals, Beverages.	Multiples, Discounters, Wholesalers, Independents.
Range	Start-ups to R&D based majors to generic manufacturers	Smallholders to agroholders	Global agribusinesses to local middlemen	SMEs to multinationals	Corner shops to hypermarkets

Source: KPMG[4]; Phillips McDougall/IHS Markit

It is estimated that the size of the global commercial seed market[5] is around $42 billion in 2018 with over half of this being GM seed (Table 2). The seed market grew rapidly in the late 1990s and early 2000s driven primarily by GM crops. However, as the GM market matured so seed market growth has tailed off.

It should be noted that the above seed market figures have been restated from those presented earlier in the year to the workgroup, as new information has become available.

[3] EBIT stands for Earnings Before Interest and Tax and is a widely use measure of profit. It is generally higher than EBITDA which stands for Earnings Before Interest and Tax Depreciation and Amortisation

[4] Most of this data relates to when the KPMG report was issued in 2013. However, a few metrics have been updated

[5] This excludes farmer saved seed and seed from public institutions

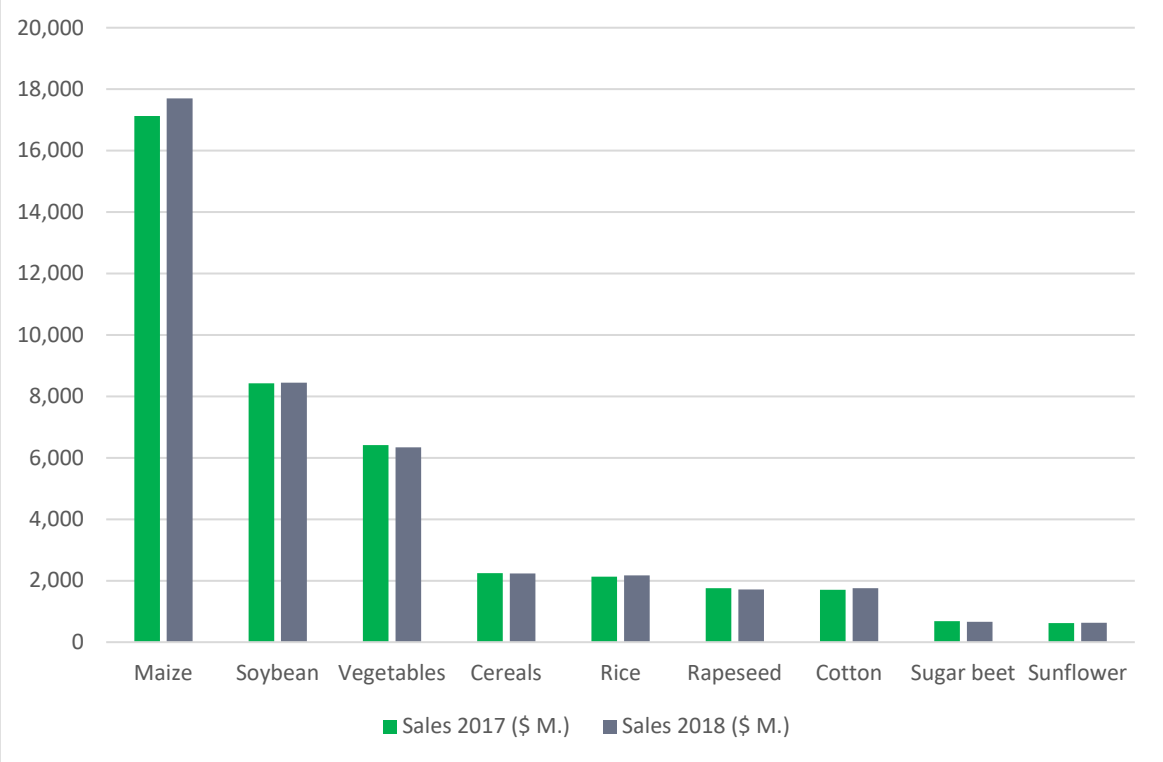
Table 2: Commercial Seed Market 2013-2018 - $m

	2013	2014	2015	2016	2017	2018
GM seed	20,100	21,054	19,789	20.039	22,206	21,970
Conventional seed	19,282	19,481	17,441	16,846	18,912	19,700
World seed market	39,382	40,535	37,230	36,885	41,419	41,640

Source: Phillips McDougall Seed Service

In terms of crop composition maize is largest market and accounts for around 42% of the global seed market followed by soybeans with 20%. Growth in both of these crops has been propelled by GM. Vegetables as a group comes third with 15% of the total market. Other crops are all relatively much smaller (Figure 2).

Figure 2: Global Seed Market by Crop

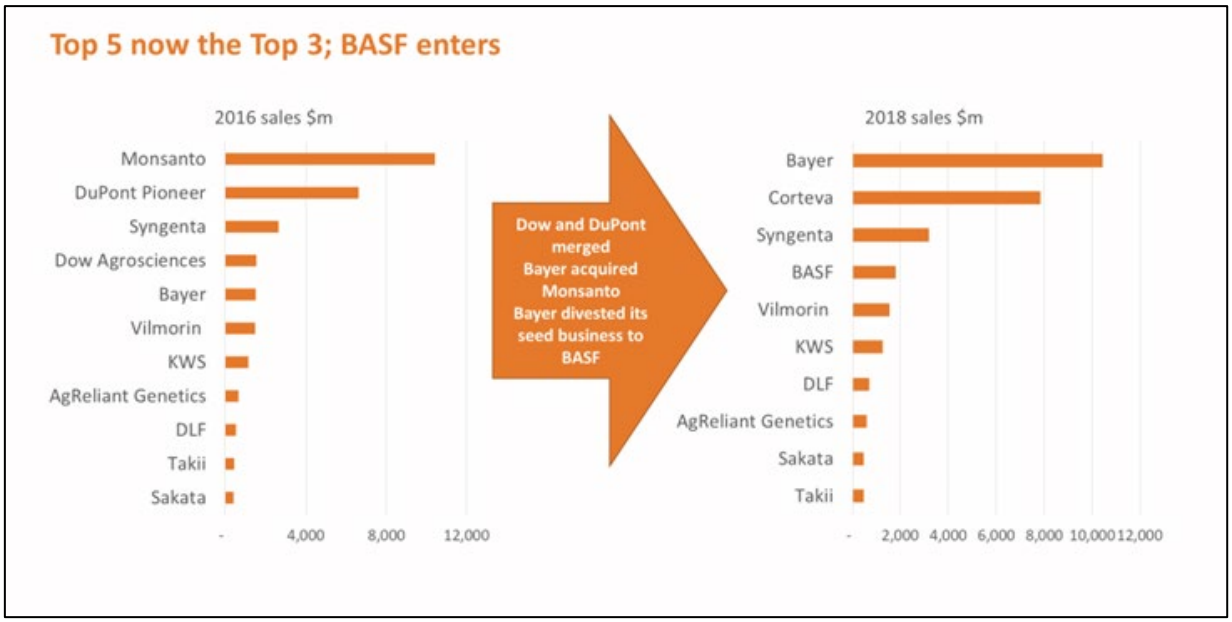


Source: Phillips McDougall Seed Service

2.2 Industry structure

The seed industry has undergone significant restructuring over the last 2 years with the top two companies – Monsanto and DuPont Pioneer – both being involved in major deals: the merger of Dow and DuPont in 2017 and the acquisition of Monsanto by Bayer in 2018. This has resulted in the top 5 companies becoming the top 3 (). BASF acquired most of Bayer's seeds business as a result of the anti-trust remedies which were required by the authorities and so has entered the seed market at #4. Dow/DuPont since spun off its agribusiness into Corteva in June 2018, which occupied the #2 position behind Bayer, with third-placed Syngenta being some way behind.

Figure 3: Changing Seed Industry Structure



Source: Phillips McDougall/IHS Markit

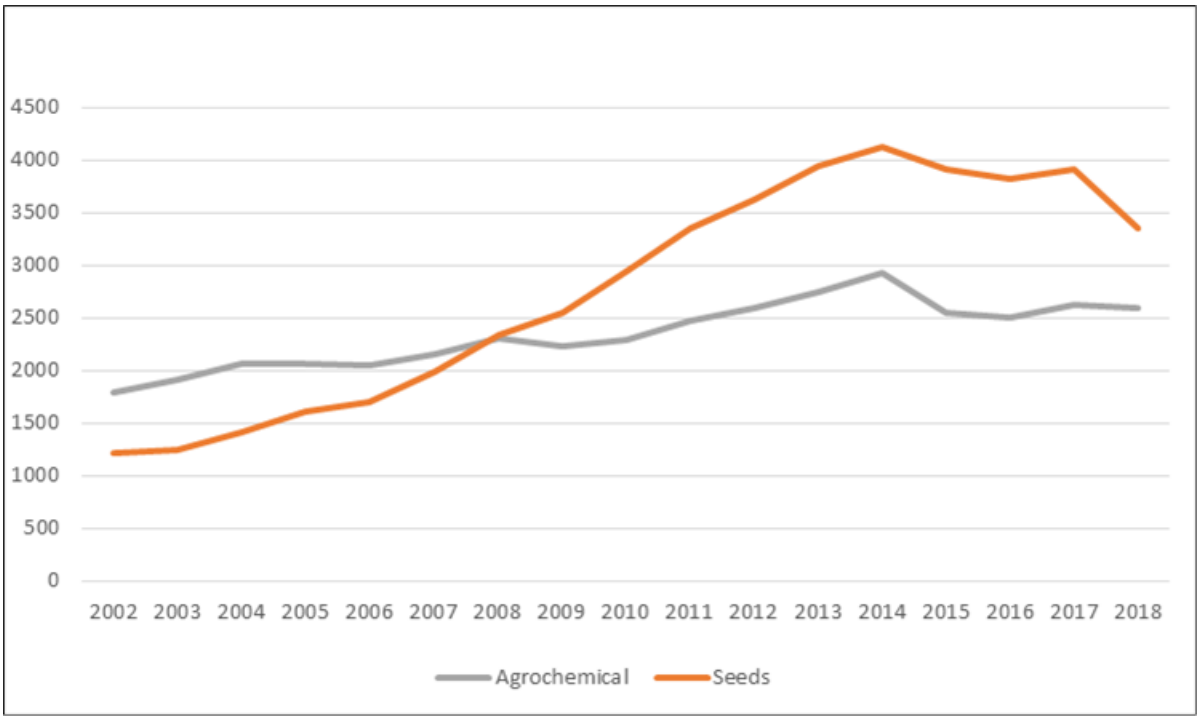
2.3 R&D

One distinctive characteristic of the seed industry is its R&D intensity. R&D spending varies widely between companies, from low single digit % of sales to around 30%. This variability shows how R&D is an important strategic differentiator between companies. At an average of around 15% this makes the seed industry one of the most R&D intensive industries in the world, on a par with pharmaceuticals. This in turn reflects the rapid rate of technological progress and availability of multiple new techniques such as CRISPR, MAB, RNAi.

As a sector, seeds contribute more R&D investment in the food chain than any other, apart, possibly, from the food companies themselves. This reflects the rapid pace of technological development in the sector and the fact that of all the inputs it is seed which contributes most to yield gain in crops. The combined R&D spend of the 6 leading seed companies is shown in. It overtook the R&D spend on crop protection in 2008, driven by the possibilities opened up by the new seed biotechnologies.

The conventional wisdom was that seeds accounted for 50% of yield gain in crops with the rest shared between crop protection and fertilizers (Duvick et al, 1999). More recent research has shown the seeds contribution to be more like 70% (Noleppa, 2016)

Figure 4: Seed Industry R&D spend compared with Crop Protection



Source: Phillips McDougall/IHS Markit

2. Analytical Framework

Because of the large number and enormous diversity of seed companies it is important to impose some sort of framework in order to be able to make sense of the industry and provide the information to the Co-Chairs of the Working Group and others in a structured manner.

For the purposes of this report companies are divided into 3 tiers:

- Tier 1: > $500m sales. These can be either specialist seed companies or diversified companies for whom seeds is one of two or more business units
- Tier 2: $100-500m sales. These tend to be specialist seed companies
- Tier 3: <$100m sales. These tend to be specialist seed companies

For Tier 1 companies the large variation in company type is shown in Table 3.

Table 3: Classification of Tier 1 Seed Companies

Tier 1 Companies	Type of company
Vilmorin, KWS, DLF, AgReliant, DLF, Kaneko, LPHT	Specialised seed companies
Corteva, Syngenta	Agribusiness companies
Bayer	Lifescience company
BASF	Diversified chemical company

The cut-off points between the tiers are somewhat arbitrary, but the logic is that each tier has some defining characteristics (e.g. R&D intensity, geographic reach) and information becomes progressively more difficult to obtain as one moves through the tiers, although it is surprisingly difficult to obtain seed-specific information from the non-seed-specialist Tier 1 companies and so the estimates made by Phillips McDougall are used. Most Tier 1 companies are listed and produce Annual Reports. Most Tier 2 companies are privately owned and file reports with their national 'Company Houses' or equivalents. Most Tier 3 companies do not provide financial information on their performance and many are family-owned.

3. Results

3.1 Annual Seed Sales by Tier and company

Tier 1 company sales

10 companies were identified as being in Tier 1. This is fewer than there used to be, as a result of recent industry consolidation. Sales for 2017 and 2018 for the 10 companies now in Tier 1 and 3 legacy companies are shown in Table 4. Together sales of these companies account for around 70% of the total seed market value.

Table 4: Tier 1 Company Sales 2013-2018 - $m

Company	2014	2015	2016	2017	2018
Current Tier 1 Companies					
Bayer	1,466	1,417	1,502	10,835	10,433
Corteva	na	na	na	8,056	7,842
Syngenta	3,155	2,838	2,657	2,829	3,204
BASF	0	0	0	1,694	1,800
Vilmorin	1,713	1,518	1,471	1,542	1,568
KWS	1,254	1,179	1,150	1,173	1,339
AgReliant Genetics	692	630	671	657	638
DLF	605	543	530	517	693
LPHT	na	na	294	473	541
Kaneko	na	na	na	531	542
Legacy companies					
Monsanto	10,685	10,021	10,437	10,913	na
DuPont Pioneer	7,614	6,787	6,642	6,807	na
Dow AgroSciences	1,604	1,453	1,533	1,455	na

Source: Phillips McDougall/IHS Markit

The above sales are for the total commercial seed market comprising both GM and non-GM seed. For companies with significant sales of the four main GM crops (maize, soybean, cotton and canola) and global coverage GM seed is likely to account for over 70% their sales. This reflects the dominant position of GM in the major seed markets for these crops i.e. North and South America. This will be the case for those Tier 1 companies with this crop focus. For companies specialising vegetable seeds there will be no GM seed sales. Likewise, as a general rule companies focused in Europe and Asia (with the exception of cotton seed companies in Asia and South Africa) will have minimal sales of GM

seed. This will apply nearly all of the companies in Tier 2 and Tier 3, for which GM sales will be less than 10% of each group.

Tier 2 company sales

30 companies were identified as being in Tier 2. Sales for these are shown in Table 5. Together these account for around 15% of the total industry value.

Table 5: Tier 2 Company Sales - $m

Company	2013	2014	2015	2016	2017	2018
Rijk Zwaan	362	423	407	431	458	493
Sakata	392	399	399	399	462	466
Takii	474	456	430	428	473	465
HZPC	na	na	na	na	339	349
Enza Zaden	261	283	266	293	322	na
Barenbrug	273	286	279	262	278	307
Advanta India	202	235	194	248	289	na
Beidahuang Kenfeng Seed	na	na	na	na	211	250
Euralis	219	235	212	192	197	231
RAGT Semences	277	291	257	232	210	na
Bejo Zaden	175	197	194	199	208	na
Nuziveedu [6]	na	na	na	na	202	na
Deutsche Saatveredelung	na	na	na	na	190	186
Europlant	na	na	na	na	155	178
Jiangsu Dauha Seed	na	na	na	na	171	na
Strube	na	na	na	na	167	na
Maïsadour	173	183	170	140	145	166
SES Vanderhave	200	180	168	109	159	162
Caussade Semences	191	213	173	155	158	na
Jiangsu Dahua Seed	na	na	na	na	191	148
Union InVivo	132	129	127	161	180	147
Win-All Hi-Tech Seed	na	na	na	na	140	141
Saaten-Union	144	149	146	139	130	na
Seed Co	na	na	na	na	135	128
Guangdong Xiannmei Seed	na	na	na	na	122	na
Denghai Seed	na	na	na	na	119	116
National Seeds Corporation [6]	na	na	na	na	121	115
Kaveri [6]	na	na	na	na	110	108
Böhm-Nordkartoffel	na	na	na	na	103	na
East-West Seeds	na	na	na	na	na	na

Source: Phillips McDougall/IHS Markit

Tier 3 company sales

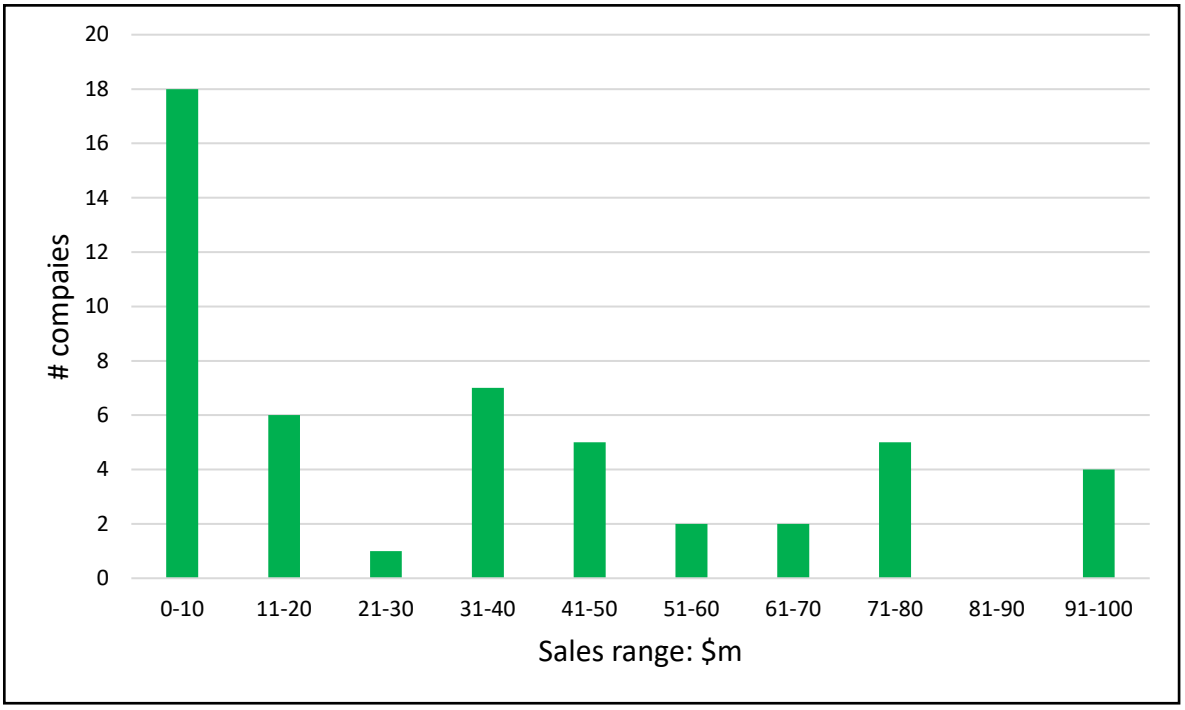
Around 100 Tier 3 companies were identified, and sales data could be found for a half of these7. The smallest companies had sales of less than $1 million. However, there is no doubt that hundreds, probably thousands of other Tier 3 seed companies exist, so the listed companies must be considered to be subset/sample. It is likely that this sample of 100 Tier 3 companies is skewed towards the larger ones for the simple reason that the they are more likely to be 'visible' and the

[6] Apr 17-Mar 18

[7] It is assumed that if a company has sales of $100m or more (i.e. is in Tier 2) then sales data will generally be available. Conversely where company sales data cannot be found the default assumption is that it is a Tier 3 company.

smaller the company the more likely it is to be 'off the radar'. Based on the 50 Tier 3 companies for which sales data could be found the distribution of sales is as shown in .

Figure 5: Distribution of Sales of Tier 3 companies in the sample for which data could be found



Source: Phillips McDougall/IHS Markit

The above chart shows 36% of companies in the sample have sales of under $10m. Because of the likely bias towards larger companies in the sample the actual percentage of the smallest companies is likely to be considerable higher.

With more time and resource the list of Tier 3 companies could be greatly expanded and the sample made more representative.

Together the Tier 3 companies are likely to account for around 15% of the total seed industry value.

3.2 Company profitability by Tier

Company profitability is influenced by many factors and can vary widely year on year. At the top level company profitability is determined by price levels and costs.

Prices will reflect the benefits of the products sold and the competitive environment. Generally GM crops are higher priced than non-GM - often by a considerable margin - reflecting the traits which they contain. Additionally, where a company out-licences its traits or seeds it will receive royalties and these can significantly contribute to profitability.

Costs comprise many different components. Generally they can be broken down into 3 areas:

- Supply-chain-related costs. These include the costs of producing the seed which itself will be a function of the product range and efficiency of production. Hence the crop mix of a company will be a major determinant of profitability.
- R&D costs. Seeds is one of most R&D intensive industries[8]. R&D costs can vary widely depending on the company strategy and choice of technologies. This contrasts with crop protection where the leading companies all spend a similar % of sales on R&D. Table 6 displays R&D costs for the leading companies.

Table 6: Seed Company R&D Expenditure, 2018 - $m

Company	R&D spend: $m	R&D % sales
Bayer	1,304	12.6
Corteva	942	12.0
Syngenta	556	18.5
BASF	441	28.7
Vilmorin	242	16.2
KWS	238	18.5
DLF	29	4.1
AgReliant Genetics	106	16.2
LPHT	68	12.5
Sakata	52	11.1

Source: Phillips McDougall/IHS Markit

Sales and marketing costs. These are determined by companies' marketing strategies (e.g. proximity to the customers, choice of distribution route) and also the structure of the value chain which can differ markedly between countries.

The multifaceted nature of profitability means that a large data set is required to reach reliable conclusions.

Another issue with profitability is that it is subject to accounting norms which can vary by country.

Although it has been possible to reach some conclusions about profitability in this study there is a large element of uncertainty around this area. Profit is a complex concept and can vary enormously year on year so there would be considerable risks in using it as a metric upon which to base any cost-sharing mechanism. Sales, although by no means perfect, is a much more reliable decision tool, and one that is used as a basis for cost allocation amongst the members of various trade associations.

Tier 1 company profitability

The companies which report profitability information is a small sub-set of those which report sales. Even for Tier 1 companies, apart from Corteva, only those which are specialised in Seeds (see Table 7) report seed profitability. For the more diversified companies which also have other businesses – notably crop protection - seed profitability is not separately reported. This applies to 3 of the 4

[8] The 2016 EU Industrial R&D Investment Scoreboard (European Commission, JRC/DG RTD) put R&D spend in the Pharmaceutical industry the highest of any sector covered at 15% of sales, followed by Software and Computer Services (10.6%), Technology Hardware and Equipment (8.4%), Automobiles and Parts (5.9%), Chemicals (2.9%) and Aerospace and Defence (2.8%). Seeds was not included on the scoreboard but would have been joint leader with Pharmaceuticals if it was.

leading companies. In the case of Bayer the leading company, Monsanto, whom they acquired, used to report their seed profitability in great detail up until 2017 so historic data could be used as a rough guide. DuPont/Pioneer, historically the #2 company, never reported separate seed profitability as part of its annual results. However when Corteva was formed the accompanying legal documents did give a single EBITDA[9] figure for 2016-2018 and the way it is reporting its quarterly results for 2019 indicate it will provide seed profitability data going forward.

Table 7: Tier 1 Company Profit data availability

Company	Reports seed profitability	Comments
Bayer	No	Monsanto did until 2017
Corteva	Yes	Gave EBIT figure in documents accompanying its formation and has now started reporting sector profit
Syngenta	No	
BASF	No	
Vilmorin	Yes	Also splits by crop group
KWS	Yes	Also splits by crop group
AgRelaint	No	
DLF	Yes	
Kaneko	?	

Source: Phillips McDougall/IHS Markit

For the purposes of this exercise, where profitability data are unavailable for companies profitability estimates derived by Phillips McDougall are used. Profitability data for Tier 1 companies in 2018 are shown in Table 8.

Table 8: Tier 1 Company Profitability, 2018

[9] EBITDA stands for Earnings Before Interest and Tax Depreciation and Amortisation. Along with EBIT (see Footnote 3) it is a widely used measure of profit

Company	Profit measure	Scope	Value	Main crops, comments
Bayer	EBIT	Ag group	22.0%	Maize, soybeans, cotton, vegetables Monsanto EBIT in 2017 was 26.7%
Corteva	EBITDA	Seed	14.5%	Maize, soybeans, cotton
Syngenta	EBIT	Ag group	15%	
BASF	EBIT	Ag group	11.9%	Vegetables, cotton, canola
Vilmorin	EBIT	Seeds	7.2%	Maize, vegetables, cereals
KWS	EBIT	Seeds	12.4%	Sugar beet, maize, cereals Acquired veg company Pop Vriend in 2019
Sakata	EBIT	Seeds	12.2%	Vegetables
LPHT	EBIT	Seeds	9.1%	Vegetables and field crops

However, these data are still incomplete so for a more consistent set of seed-specific profitability estimates Phillips McDougall analysis for 2017 is more helpful.

Table 9: Tier 1 Seed Company Profitability 2017

Company	EBIT % 2017	Crops
Monsanto	26.7%	Maize, soybean, cotton, vegetables
Corteva	9.5%	Maize, soybean, cotton
Syngenta	10.0%	Maize, soybean, oilseeds, vegetables
Bayer	5.0%	Canola, vegetables, cotton, rice
Vilmorin	8.4%	Maize, vegetables,cereals
KWS	12.2%	Sugar beet, maize, cereals
DLF	5.7%	Forage crops
AgReliant	10%	Maize, soybeans
Kaneko	3.5%	Vegetables
Average	16.1%	
Average w/o Monsanto	**9.1%**	

Source: Phillips McDougall/IHS Markit

Based on this, average profitability for the Tier 1 companies was 16.1% of sales in 2017. However, until its acquisition by Bayer, Monsanto was by far the most profitable company. In fact Monsanto probably accounted for over 50% of the total industry profit pool. This can be attributed to its pioneering position with GM crops which allowed it to charge premium prices as it added new traits, such as insect resistance and herbicide tolerance, to its crops. Royalty income from its out-licensing of traits to other companies would also have boosted its profitability. Excluding Monsanto Tier 1 company profitability would have been 9.1% in 2017.

Generally, excluding Monsanto, Tier 1 seed company profitability lies within the range 5-15%.

Tier 2 company profitability

Profitability data for 2017 could be found for around one third of the 30 Tier 2 companies covered in this analysis. Average profitability for these was around 11% in 2017.

Table 10:Tier 2 Company Profitability

Company	2017	2018	Crops
Deutsche Saatveredelung AG	2.0%	2.9%	Field crops
MAÏSADOUR SEMENCES	-0.1%	2.8%	Field crops
Barenbrug	6.9%	6.9%	Turf
Bejo Zaden	8.8%	n.a.	Vegetables
Enza Zaden	20.6%	n.a.	Vegetables
Europlant	2.6%	3.1%	Potatoes
HZPC	1.6%	n.a.	Potatoes
RAGT	3.5%	7.8%	Field crops
Rijk Zwaan	26.3%	n.a.	Vegetables
Sakata	12.5%	12.1%	Vegetables
Average profitability	11.1%	n.a.	-

Source: Phillips McDougall/IHS Markit

Tier 3 company profitability

Very few Tier 3 companies report profitability data. Data could only be found for 6 out of the 100 Tier 3 companies in the database. Average profitability seems to be around the 5% level.

Table 11:Tier 3 Company Profitability - %

Company	2017	2018	Crops
Böhm-Nordkartoffel Agrarproduktion GmbH & Co. OHG	5.6%	3.0%	Potato
Maison Florimond Desprez	5.9%		Field crops
SEMILLAS FITO, SAU	4.8%		Diversified
Strube Research GmbH & Co. KG	-44.5%	-11.0%	Field crops
Saaten-Union	0.7%	0.0%	Field crops
Technisem	8.9%		Vegetables

Source: Phillips McDougall/HIS Markit

3.3 Profitability by crop

Company sales by crop are shown in Table 12.

The only way to get crop profitability data is if multi-crop companies report some of their crop lines separately (the best way as it eliminates inter-company variability caused by differences in functional costs such as R&D and sales and marketing) or if a company for which profitability data is given is predominantly one crop. Only two companies fall into the first category - KWS and Vilmorin. Monsanto did but has ceased to exist as of 2018. There are more companies in the second category, particularly those specialising in vegetables (e.g. Rijk Zwaan), turf (e.g. DLF) and potato (e.g. HZPC).

Table 12: Company Sales by Crop - $m

	Maize	Soybeans	Cotton	Veg & Flowers	Cereals	Sugar beet	Others
Bayer	5685	2791	620	827	<500	0	<500
Corteva	5254	1412	157	0	<150	0	863
Syngenta	1232	481	0	661	NA	0	661
BASF	NA	169	215	445	NA	NA	706
Vilmorin	134	NA	0	807	209	0	344
KWS	576	NA	0	0	67	562	0
DLF	0	0	0	28	0	97	568
AgReliant Genetics	488	150	0	0	0	0	13
LPHT	92	NA	NA	43	NA	0	406
Sakata	0	0	0	466	0	0	0
Takii	0	0	0	465	0	0	0

Source: Phillips McDougall/IHS Markit

From the limited company profitability data reported above certain patterns are already evident. Sugar beet is the most profitable crop, maybe because it benefits from the tightly controlled value chain of which it forms a part. Specialised vegetable companies for example are generally more profitable than turf ones which are in turn more profitable than potato companies.

It is difficult to distinguish between the profitability of maize and soybean, the two largest crops in terms of seed market. Most companies which sell one also sell the other. One would expect maize to be more profitable as it is a hybrid crop, but according to Monsanto's historical results the opposite was the case. As group maize and soybean seem to have relatively low profitability.

Based on the available data the following estimates of crop profitability are derived.

Table 13: Crop profitability

Crop	Average profitability	Range
Sugar Beet	>20%	Na – sample too limited
Vegetables	20%	10%-30%
Turf	8%	7-9%
Field crops	5%	Loss-making – 10%
Potatoes	<5%	1-3%

Source: Phillips McDougall/IHS Markit

Interestingly there is a rough correlation between profitability and seed planting density. This is not surprising as the higher the seed planting density, the higher the likely costs for the farmer and the lower his own profitability is likely to be, leaving less value added for the seed company to share in. There is an analogy here with the crop protection market in which more biologically active products (i.e. for which lower application rates are required) tend to be more profitable.

4. Summary and Conclusions

This study is based on a database of 140 companies which cover all Tier 1 companies, the majority of Tier 2 (a few might have escaped detection) and 100 Tier 3 which is likely to be a small proportion of the total number in that tier. The main metrics for each Tier are summarised in Table 14.

Table 14:Summary of main properties and characteristics of the 3 Tiers

	Tier 1	Tier 2	Tier 3
Sales range: $m	>$500m	$100-500m	<$100m
% total market	69%	15%	16%
Profitability: EBIT % Sales	10%	10%	5%
Companies in database	10	30	100
# Companies in existence	10	30-40	Hundreds (probably thousands)
# for which there are sales data	10	30	50
# for which there are seeds profit data (reported)	2	10	6
# for which there are crop profit data	2	0	0
Signatories to the 2017 Letter of Commitment[10]	4	12	25
Source of financial data	Annual reports, PMD estimates	Annual reports, Company House Submissions PMD estimates	Annual reports, Company House Submissions PMD estimates

This research has captured companies covering more than 85% of the market sales and at least the same percentage, if not more, of industry profit. Tier 1 companies account for almost 70% of industry sales and probably a higher % of the profit given the high profitability of the Monsanto seed business acquired by Bayer.

- Company profitability: There is a large range of company profitability ranging from loss-making to 30% EBIT. The average profitability in Tier 1 is around 15%, with Bayer's acquired Monsanto business being at the top end and probably accounting for over half of the total Tier 1 profit. Average profitability for Tier 2 companies is around 10%.

[10] Before the seventh meeting of the Working Group, the Co-chairs received a declaration of commitment signed by 23 seed companies (expanded to 41 before the Seventh Session of the Governing Body), based in Asia, Europe and North America, expressing their intention to become subscribers under the enhanced Multilateral System, provided that certain business critical conditions are met. The companies withdrew such commitment in 2018; the seed sector has been very active since then in making proposals to enhance the Multilateral System. Available at: http://www.fao.org/fileadmin/user_upload/faoweb/plant-treaty/EFMLS/BS773e.pdf

- Crop profitability: Estimates for crop profitability suggest that sugar beet is the most profitable crop, followed by vegetables, as a group, turf, maize/soybean and finally, potatoes.

5. References

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6. Disclaimer