

“\$27 BILLION” REVISITED

THE COST OF CANADA’S ANNUAL FOOD WASTE

* * * * *

2010: \$27 Billion | 2014: \$31 Billion

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December 10, 2014

“Consumers are busy picking off deals, while retailers and suppliers are busy picking off each other. This produces enormous amounts of food waste and is unsustainable.” (*Industry expert*)

While Value Chain Management International has verified the secondary data presented in this report wherever possible, we cannot guarantee that the information provided by Statistics Canada, peer reviewed papers, and other sources is accurate.

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Acknowledgments

We would like to thank Dr. Peter Whitehead (UK food expert) for his advice and guidance, as well as Nicole Marenick (VCMI Associate) and Professor Ralph Martin (Loblaw Chair, Sustainable Food Production, University of Guelph) for their editorial input. We would also like to thank the many individuals from food businesses and organizations, including Metro Vancouver, who shared their expertise and contributed information during the writing of this report.

About VCMI

Value Chain Management International (VCMI) is dedicated to improving the profitability and competitiveness of commercial businesses – primarily in the agriculture, aquaculture, marine, and food industries – through promoting and enabling the management of the value chains in which they operate. VCMI achieves this by assisting businesses to develop closer strategic relationships with customers and suppliers, resulting in them being able to realize greater profits than otherwise possible.

VCMI has co-authored several publications on food wasteⁱ and founded the “Cut Waste, GROW PROFIT™”ⁱⁱ initiative in 2012. VCMI is a leading public and industry voice in bringing awareness to the opportunities and solutions surrounding food waste reduction, traceability, and the environment. The company has worked extensively in the international field of food waste reduction and traceability. VCMI applies specialized value chain diagnostic tools to detect where waste occurs, how to eliminate it, and then participates in the elimination implementation to ensure successful outcomes.

ⁱ See Appendix B

ⁱⁱ Cut Waste GROW PROFIT™ is a VCMI program, which enables farmers and food businesses to profit by eliminating as much waste as possible from within their operations from a whole of chain perspective.

Executive Summary

Food waste causes immense financial costs, especially as it never occurs in isolation — energy, labour, water, and other resources used to produce and distribute food are also wasted. For businesses, the total cost of waste occurring along a value chain can exceed the combined margins of the involved companies. For consumers, avoidable food waste can increase the cost of food by 10 percent or more. Regardless of how much food is wasted in the home, we all pay for the waste that occurs before the point of purchase.

How many items must a retailer, manufacturer, distributor, or farmer sell to cover the costs borne from each item wasted or lost? To our surprise, this is a question that businesses typically cannot answer.

In today's hyper-competitive food industry, few opportunities exist for businesses to reduce operating costs by 15 to 20 percent and increase profitability by the equivalent of 5 to 11 percent. Addressing food waste is a clear opportunity for businesses to be more profitable and to actively contribute to a more environmentally and socially responsible world.

Why then, despite these huge costs and benefits, are businesses hesitant to change? One important impediment is the adversarial relationships that typify the food industry. In the words of an industry expert whom we spoke with during the researching of this report, "Consumers are busy picking off deals, while retailers and suppliers are busy picking off each other. This produces enormous amounts of food waste and is unsustainable."

The impact of adversarial relationships on the creation of avoidable food waste became a common theme throughout the researching of this report. This caused us to reflect on how our first food waste report came into being. Released in 2010, "Food Waste in Canada" culminated from our work with commercial industry and our research into the determinants of business performance. Our journey led us to consider food waste to be a symptom of ineffective and inefficient processes occurring along the value chain. Food waste that occurs in the home is a symptom of individual consumers' behaviour.

In conducting research for this report, we revisited our \$27 billion 2010 estimate of the value of annual food waste in Canada. We found that the **quantifiable** value of food waste in Canada is actually **\$31 billion**. This 15 percent increase stems from new knowledge and insights that were not known to us in 2010. These include figures surrounding seafood from capture through to processing and a portion of the international catering waste (described later in the report) that we are confident in reporting. The increase is not due to any measurable changes within the sectors that we analyzed in 2010.

The **true** value of food waste is much higher. Such little quantifiable data exists on avoidable food waste occurring in institutions – such as hospitals, prisons, and schools – that we purposely omitted them from our calculations. We also purposely omitted estimations on food waste occurring in the majority of the travel industry. Researchers state the highest per capita waste occurs on cruise liners.

The United Nations' Food and Agricultural Organization (FAO) estimated that the cumulative cost of associated wastes (energy, water, land, labour, capital investment, infrastructure, machinery, transport, etc.) is approximately two and a half times greater than the "face value" of wasted food. Using FAO's formula, the overall cost of annual food waste in Canada **exceeds \$100 billion**.

The report concludes by describing approaches that businesses can use to benefit financially by reducing food waste and associated resources. The greatest determinant of whether businesses grasp the potentially immense opportunities that undoubtedly exist is the attitudes of individual managers and employees.

1 Introduction

Our food system is under stress. Some say that our food system is broken.¹ Reducing food waste offers businesses from across the food industry the opportunity to reduce costs and increase profitability. Reducing food waste through the value chain also benefits consumers, who ultimately pay for the loss.

As stated by US-based Food Waste Reduction Alliance: “Reducing the volume of food wasted in food manufacturing, retailing, and foodservice operations means reducing the overall costs of these operations. Efficient, cost-effective companies are best positioned to deliver affordable products to consumers, grow, create jobs, and support their communities.”² The extent of those opportunities is often understated and can be enormous.

The implications of food waste extend beyond the availability and use of natural resources and the environment; it increases the cost of food. Businesses tell us that the waste they experience unequivocally translates to consumers paying more for food. Waste also reduces businesses’ profitability and competitiveness. The greatest financial opportunity for businesses is not through redirecting food waste from landfill to food banks, composting, or producing energy from bio-digesters; it is preventing food waste at source. Not doing so creates enormous economic, environmental, and social costs for businesses and society.

The cost of food waste also impacts farmers’ revenues and profitability. The costs farmers incur are for 100 percent of their crop or livestock produced, regardless of how much they sell. Yet, the revenues farmers receive are determined by the percentage of production that consumers purchase, and the financial arrangements that exist between businesses along the value chain. Food waste can impact farmers’ profitability more than downstream businesses, because their position within the value chain makes them least able to penalize their suppliers if their own or their customers’ operations are inefficient. A similar scenario exists within the seafood industry.

At the end of the value chain, retailers, restaurants, hotels, and other foodservice operators have the greatest ability to penalize suppliers rather than take full accountability for the effectiveness of their operations.

This report and its findings are based on four sources of information:

1. Our international experience of working with agricultural and food businesses to improve their competitiveness and profitability;
2. Two decades of research by the VCMI team into challenges and opportunities facing agricultural and food businesses, and the determinants of performance;
3. Third party research conducted in Canada and elsewhere; and
4. Discussions with industry experts and business managers.

2 Our Food Waste Journey

Stated in simple terms, food waste is the loss of food along the value chain that is suitable for human consumption, or will be fit for consumption after processing — such as wheat. It occurs at various stages along the food chain from farm to consumers.³

Our first food waste report — released in 2010 — gained international interest, has been referenced over 100,000 times, and is considered one of the groundbreaking North American studies on food waste. Yet the report did not start life as a commentary on food waste and its impact on Canadian business and consumers; it was the culmination of a journey that evolved from our work with commercial industry.

Our commercial work uncovered that there are three distinct factors associated with businesses that consistently enjoy high margins and sustainable profits. The owners/management team are:

1. Highly innovative. They continually ask themselves “why” and seek to understand the root causes of issues they face.
2. Dissatisfied with the status quo and believe that there is a better way to do things. This drives them to explore opportunities to learn from their own operations and work with trusted business partners.
3. Passionate about their business. This passion pushes them to discover and apply innovative approaches to business. By consequently reducing their costs more than their industry peers, their businesses are more competitive and profitable, and ultimately experience lower levels of waste.

Our journey led us to consider food waste as a symptom of ineffective and inefficient processes — from the production of agricultural products through to distribution, processing, and retailing or foodservice. The food waste that occurs in the home is a symptom of individual consumers' behaviour, which can be exacerbated by decisions made by commercial businesses.

FAO estimated that the cumulative cost of these wastes is approximately two and a half times greater than the cost of wasted food.

Donations to food banks and the production of bio-energy from food waste redirected away from landfill are positive steps; however, they produce considerably fewer financial and environmental benefits than if food waste was prevented in the first place. The earlier along the value chain that issues resulting in food waste are addressed, the better. This is because food waste never occurs in isolation. It also results in wasted energy, water, land, labour, capital investment, infrastructure, machinery, and transportation. The United Nations' Food and Agricultural Organization (FAO) estimated that the cumulative cost of these wastes is approximately two and a half times greater than the cost of wasted food.⁴

3 Revisiting \$27 Billion

With more evidence on the incidence and causes of food waste having emerged since “Food Waste in Canada” was published in November 2010, we felt it was time to revisit our initial calculations. That said, the further we have delved into the topic of food waste, the more we have come to realize how far Canada has to go in quantifying and addressing food waste.

During the process of developing this report we interviewed industry experts and researchers. We also reached out to wider industry stakeholders, such as government employees and employees from industry organizations. Everyone we spoke with believes that food waste negatively impacts businesses’ profitability. It also in turn increases the cost of food to consumers, with each player in the food chain factoring the cost of waste into their prices.

Speaking with commercial businesses and institutions operating along the value chain enabled us to test whether our estimates were indicative of their personal experience. It also enabled us to more clearly identify root causes and their impact on creating food associated wastes along the value chain. Four things quickly became clear: two relate to the value of food waste, and two relate to causes of and solutions for food waste.

Value of food waste

1. Our initial estimates had not sufficiently reflected two important categories of waste: international hospitality (e.g., airlines, cruises) and institutions (e.g., hospitals, schools, prisons).
2. Our 2010 analysis had not encompassed all areas of the food chain (in particular, seafood – including catch and processing).

Food waste causes and solutions

3. Relatively little has changed in terms of a concerted effort to objectively quantify and address food waste across the industry. Reasons for this include that businesses typically are wary to discuss food waste openly. They do not see the full impact that food waste has on their operations and profitability, because they do not address it from a value chain perspective.
4. This lack of communication and collaboration relating to food waste directly correlates with the adversarial relationships that typify the food industry.

We revisit these findings in Section 5 of the report.

4 Quantifiable Value of Food Waste in Canada — New Insights

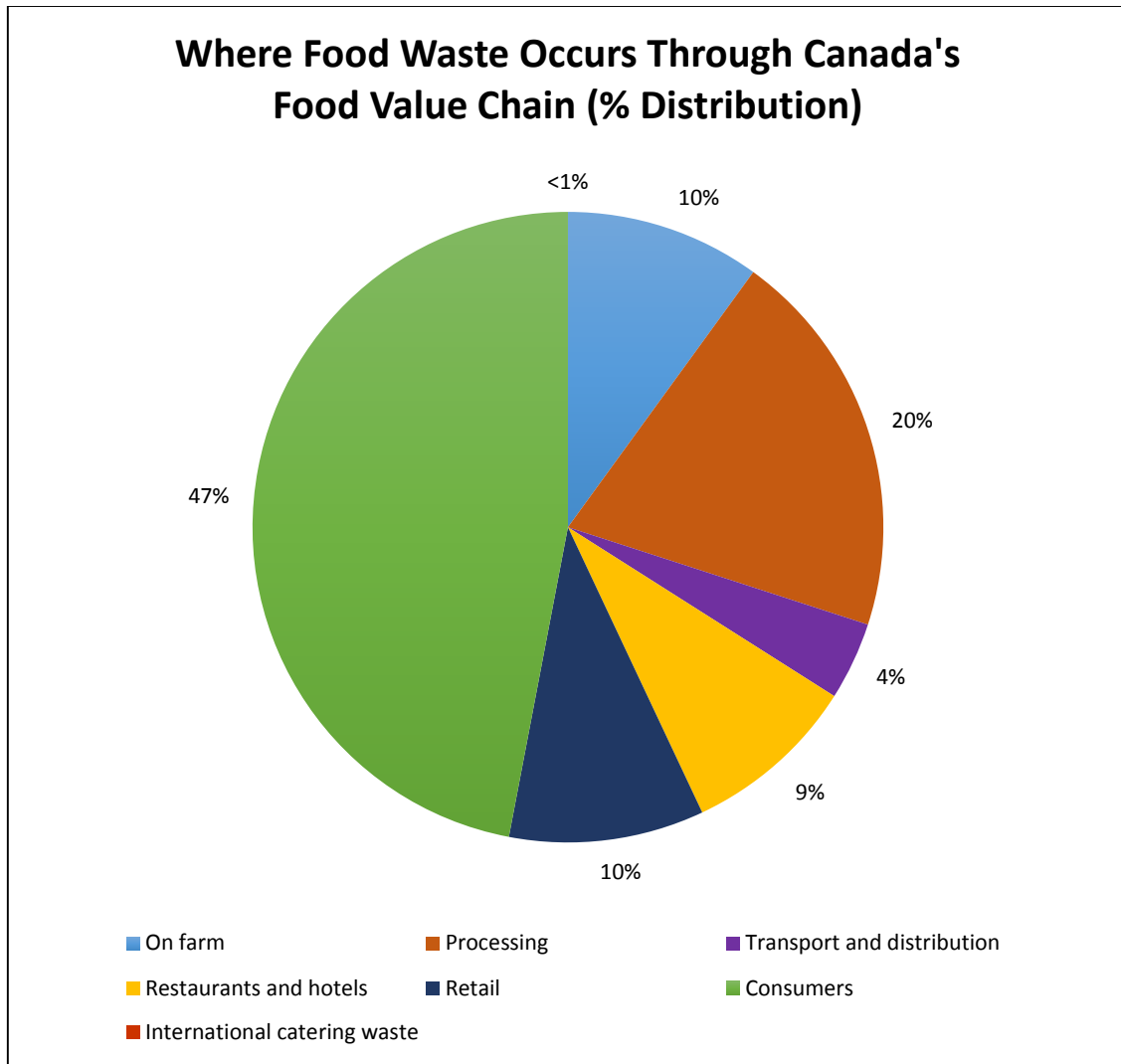
Our new estimate for the **quantifiable value** of food wasted annually in Canada has risen by 15 percent to \$31 billion. This equates to food that we describe as terminal waste — that which goes to landfill, composting, bio-digestion, or animal feed. Some of it will be redistributed through food banks. It does not reflect the lean thinking and process improvement aspects of food waste. We revisit this topic when describing the **true cost** of food waste.

It is important to understand that the 15 percent increase stems from new knowledge and insights that were not known to us in 2010. These include figures surrounding seafood from capture through to processing, as well as a portion of the international catering waste (described later in the report) that we are confident in reporting. The increase is not due to any measurable changes within the sectors that we analyzed in 2010.

Appendix A describes our calculation process. Presented below and in the appendix are reasons provided by institutional stakeholders that suggest why the actual figure of food waste in Canada is higher than \$31 billion. One reason relates to food waste generated by institutions, the value of which experts know is significant. However, the verifiable information required to incorporate this waste into our statistics does not exist. For this reason, we are discussing it, but have not included it as part of our calculations.

Figure 4-1 below illustrates where quantifiable food waste occurs along the value chain.

Figure 4-1: Where Food Waste Occurs Through Canada's Food Value Chain (% Distribution)



Compared to our 2010 assessment, the distribution percentage is relatively unchanged. A direct comparison between our 2010 and 2014 calculations forms Table 1 below.

Table 1: 2010 vs. 2014 Figures by Value Chain Segment

Value Chain Segment	2010 Calculations	2014 Calculations	Change
On farm	9%	10%	+1%
Processing	18%	20%	+2%
Transport and distribution	4%	4%	-
Restaurants and hotels	8%	9%	+1%
Retail	11%	10%	-1%
Consumers	51%	47%	-4%
International catering waste	-	<1%	+ <1%

4.1 Consumers

The most noteworthy adjustment between 2010 and 2014 is the percentage value of food waste occurring in households, which has reduced from 51 percent to 47 percent. It should be noted that the value of household waste has not reduced; the percentage difference is due to our overall estimations of food waste having increased. Having said that, the value of consumers' waste has increased from 2010's report estimation of \$13.7 billion to \$14.6 billion.ⁱⁱⁱ

4.2 International Catering Waste and Institutions

Although there is a lack of verifiable data, a discussion is warranted on two significant sources of food waste: international catering waste (included in above table and figure) and institutions (referenced above).

4.2.1 International Catering Waste

Waste produced by airlines, cruise ships, merchant ships, yachts, cross-border trains, and the military is commonly called "international catering waste" (ICW). Unfortunately, there is a lack of quantifiable data relating to cruise ships and military, domestic, and cross-border flights between the US and Canada. Therefore, only data relating to selected international flights are included in our ICW calculation above.

Airline-related ICW in Europe alone (2009) could feed over 200,000 inhabitants of poorer countries for a year.

Although there is a lack of information on the sector, reasonable estimates suggest that ICW is a major food waste contributor. It has been estimated that airline-related ICW in Europe alone (2009) could feed over 200,000 inhabitants of poorer countries for a year.⁵ The highest occurrence of food waste occurs on long-haul flights and is created by first and business class travelers, 21 and 12 percent,

ⁱⁱⁱ This reflects Canada's 1.5 million population increase from 2010 to 2014. Data per household for 2014 is not available.

Regulations stipulate that uneaten food aboard international flights must be discarded on arrival.

respectively. This compares to 9 percent from economy class passengers. The key reasons why long-haul flights created added waste are the number of meals served, and that regulations stipulate that uneaten food aboard international flights must be discarded on arrival.⁶

It has been stated that no airline has established a comprehensive food waste reduction program. A similar scenario is said to exist among cruise liners. However, our research did uncover a few food waste reduction initiatives within the airline industry. Emirates serves food leftovers from domestic flights in their staff cafeteria. Qantas encourages passengers to order their meals when checking in so that only food required is brought on board. They incentivize passengers to order their meals ahead of time, by offering menu choices that are not otherwise available.

The highest per capita food waste is reported to be produced by cruise liners.

The highest per capita food waste is reported to be produced by cruise liners. Approximately 230 ocean-going cruise liners operate worldwide.⁷ Little firm evidence exists for the amount of food waste created by cruise liners, though estimates range between 0.25 kg and 5 kg⁸ per person per day. Brock University estimated that worldwide, 19 million people took cruises in 2001. Using 1 kg per day as a conservative benchmark and 7 days as the average holiday, cruises create an estimated 133,000 tonnes of food waste per year. This figure does not account for other water craft, such as river cruises.

EPA is concerned about the impact (discharged food waste) has on water quality and marine life.

Ground up, then discharged (a common practice) at sea if international, and into lakes or rivers if domestic, cruise liners' food waste occurs to such an extent that the Environmental Protection Agency is concerned about the impact this has on water quality and marine life (due to the resultant reduction of oxygen levels, the raising of acidity, and the creation of a nutrient imbalance).⁹

Canada has fewer regulations on the discharge of solid waste at sea than other countries. Combined with the fact that existing regulations are not well enforced,¹⁰ and that the cruise industry is essentially monopolistic, these elements are all said to have influenced a general lack of desire among cruise operators to combat food waste.

4.2.2 Institutional Food Waste

Most institutions are funded by tax dollars; therefore, the cost of food waste from institutions is borne by the general public. Interviews with industry experts unequivocally told us that little is known about the value and volume of food waste that occurs in institutions. They know it can be immense. In Sweden institutional food waste was measured at 20 percent.¹¹ The experts with whom we spoke know that reducing such waste provides a significant financial opportunity; for example, by reducing the high disposal costs associated with organic waste. Because food is heavy, it is expensive to dispose of.

4.2.3 Hospitals

Among institutions, hospitals have the widest and most complex array of waste, ranging from hazardous to organic. Organic waste includes paper towels and food waste. Hospitals have three streams of food waste:

1. Patient meals
2. Food brought in by visitors
3. Staff meals (*includes waste from vendors preparing/serving food in the hospital cafeteria*)

In 2000 the cost of food waste in a 1,200-bed UK hospital was calculated to be £229,034.

In 2000 the cost of food waste in a 1,200-bed UK hospital was calculated to be £229,034.¹² This equates to ~\$515,000 CDN using an exchange rate of 2.247. This was only for the cost of the food wasted, not associated costs such as preparation, distribution, and disposal.

In 2010 ... the annual value of food wasted in Canadian hospitals would have been approximately \$45 million.

Random tests conducted in 2013 showed that a typical large Toronto hospital experienced over one tonne of food waste per day. Anecdotally, we were told that food waste created by hospital patients often reaches 50 percent. The cost of hospital food waste is estimated at equating to over \$1.50 per patient per day. In 2010 there were 91,813 hospital beds in Canada.¹³ Using a 90 percent calculation occupancy rate, the annual value of food wasted in Canadian hospitals would have been approximately \$45 million. Again, this does not account for any associated costs.

One cause of this waste is related to the fact that many hospitals no longer prepare their own food. Preparing off-site requires a two-day lead time, during which a patient may be moved, discharged, or have a procedure that interferes with his/her eating. Furthermore, the processes to order food can be cumbersome. Food delivered to patients is not necessarily desired, required, or appropriate. Food brought in by visitors exacerbates the waste among patients. It also makes the task of ensuring food waste is composted versus sent to landfill more difficult, as it is placed in garbage bins rather than collected on trays. Food vendors in hospital cafeterias and staff leftovers also contribute to the food waste emanating from hospitals.

4.2.4 Prisons

Anecdotally we were told that the food waste which occurs in prisons can be significant; however, we could not find any publicly available data. That prisons' per person budget for food is higher than most other institutions underlines the extent of the issue.

A notional figure of \$0.50 of avoidable food waste per person per day equals almost \$30 million annually.

For example, per person daily food budgets for prisons, long-term care facilities, and hospitals is approximately \$12.50, \$7.80, and \$3.50, respectively. The number of offenders incarcerated in Canada's correctional system on any given day in 2010/2011 was 163,000 adults (aged 18 years and over).¹⁴ A notional figure of \$0.50 of avoidable food waste per person per day equates to an annual cost of almost \$30 million. This figure only comprises adult prisons and does not include costs related to youth detention centres. It also does not include associated costs.

4.2.5 Schools

Similarly, minimal data exists on food waste in schools. Reports provided by municipalities, mostly in confidence, from across Canada show that avoidable food waste in schools can be significant. The percentage of compostable organics, which includes food waste, regularly accounts for approximately 40 percent of all waste produced by schools. The percentage of food waste is typically not measured by weight or value as a portion of overall organic waste. Avoidable food waste in schools is a combination of food produced in the school and food brought from home. As with hospitals, the fact that food is a heavy waste markedly increases its cost of disposal.

4.3 Putting \$31 Billion into Context

To provide context, the updated quantifiable \$31 billion of annual Canadian food waste equates to the following:

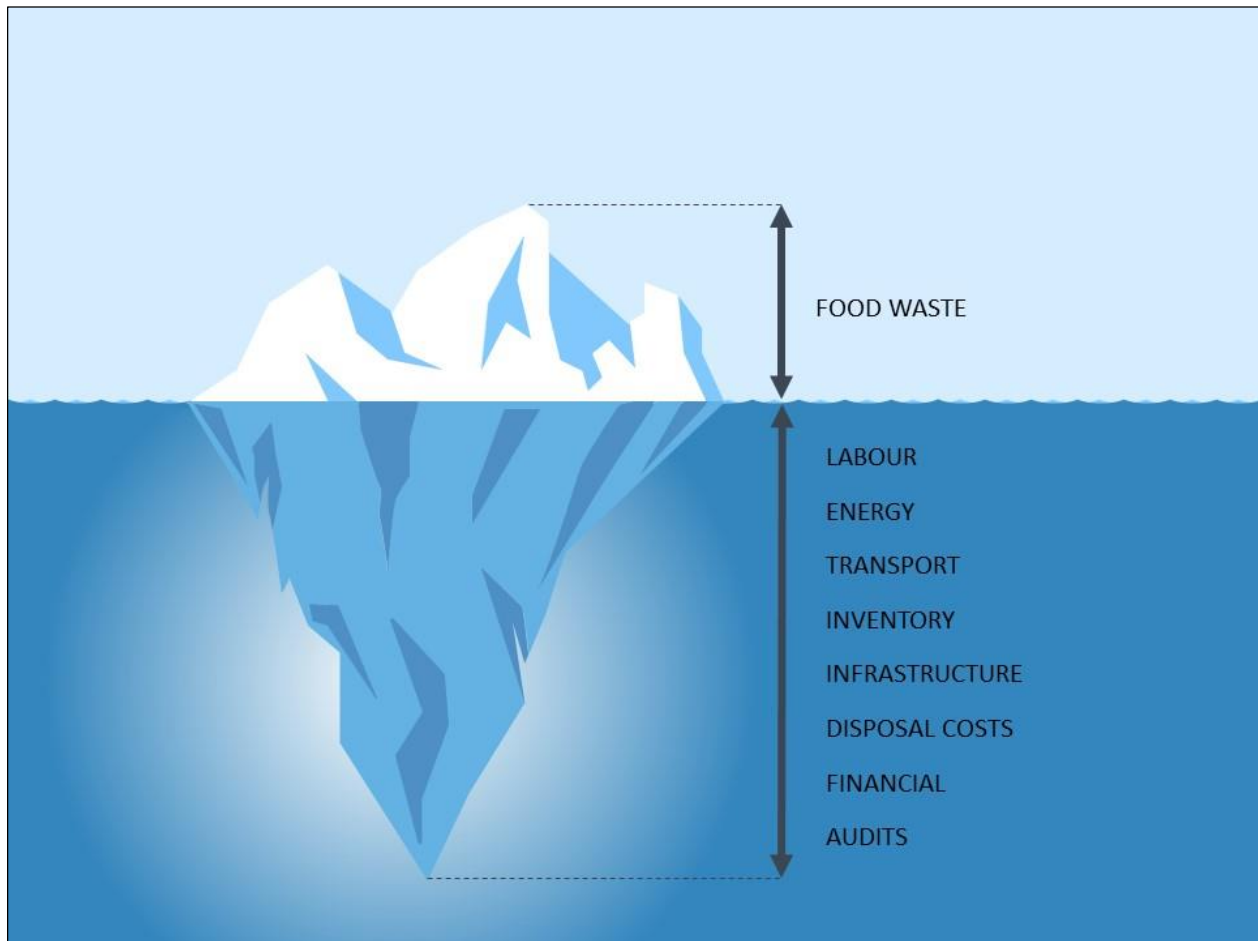
- Approximately 30 percent of what the Canadian agriculture and agri-food system (AAFS)¹⁵ generated in 2012
- 2 percent of Canada's gross domestic product (GDP) in 2013
- More than Canadians spent on food purchased from restaurants in 2011
- More than two-thirds of the value of all Canadian agricultural and agri-food exports (\$43.6 billion) in 2012
- Slightly below the value of all Canada's agricultural and agri-food imports (\$32.3 billion) in 2012
- Higher than the combined GDP of the 29 poorest countries

5 The True Cost of Food Waste

The Canadian food industry is complex. It is also characterized by slim margins and profits. Businesses cannot experience food waste without incurring associated costs. Capital investments in infrastructure and inventory, labour across the entire organization (*not just in the processing facility, store, or distribution centre*), energy, financial charges and reconciling accounts, disposal fees, price markdowns, repackaging, transportation, equipment wear and tear — these are just some of the supplementary costs associated with food waste that impact business profitability.

Figure 5-1 illustrates the true cost of food waste. When the administration, financial checks and balances, audits, investigations, internal meetings, and subsequent negotiations that are associated with food waste are factored into the equation, the true cost of food waste balloons to enormous proportions ... with consumers ultimately left holding the bill.

Figure 5-1: The True Cost of Food Waste



Iceberg graphic outline c/o © Copyright Showeet.com

Businesses which have the lowest waste experience higher margins and profits.

Therefore, it makes sense that businesses which have the lowest waste experience higher margins and profits. However, most businesses have typically become so focused on minimizing per unit costs that they have lost sight of the bigger picture. They do not ask themselves how many products they must sell to make up for each product lost. Neither do they typically consider adopting a less volume-driven competitive model.¹⁶

How many cattle must a beef farmer sell to make up for every one that dies? How many cans or bottles must a beverage manufacturer sell to recoup the cost incurred through each one wasted? Given their slim margins, how many bags of salad, trays of meat, or containers of yogurt must a retailer sell to simply break even?

Average loss (shrink) in produce, meat, and seafood in retail stores is 5 to 6%, 3 to 4%, and 2 to 3.5%, respectively.

Industry experts told us that the average loss (shrink) in produce, meat, and seafood in retail stores is 5 to 6 percent, 3 to 4 percent, and 2 to 3.5 percent, respectively. Actual losses can vary widely and be significantly higher. Retailers typically do not track the losses caused from having to markdown or throw away items.

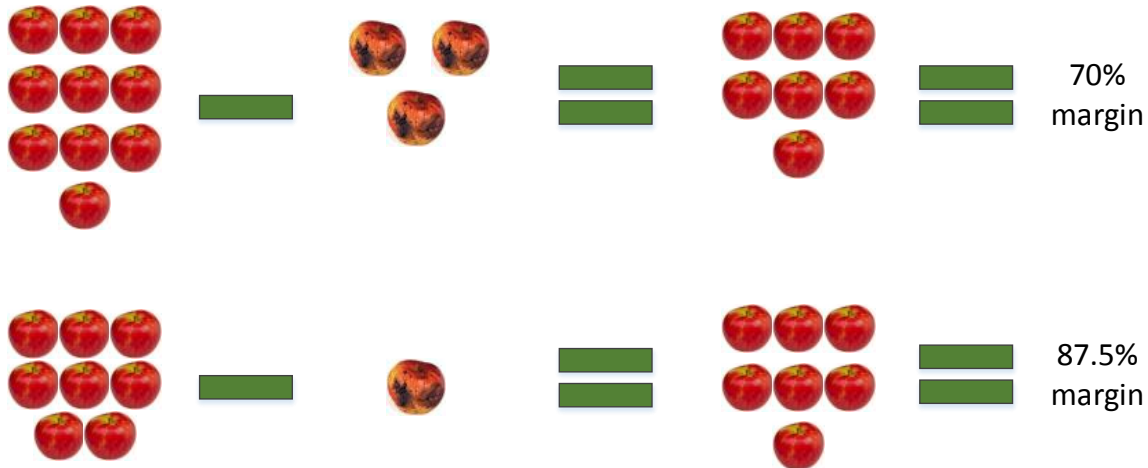
A retailer might have to sell 15 to 20 items simply to breakeven on every item lost.

Supermarkets' gross margins are around 24 percent across their entire operation.¹⁷ Grocery retailers' operating profit margin for supermarkets (operating revenue minus operating expenses and costs of goods sold) is typically around 1.6 percent. With typical net margins of 5 to 8 percent in produce and 8 to 15 percent in meat, a retailer might have to sell 15 to 20 items simply to breakeven on every item lost. Similar scenarios exist among processors and distributors.

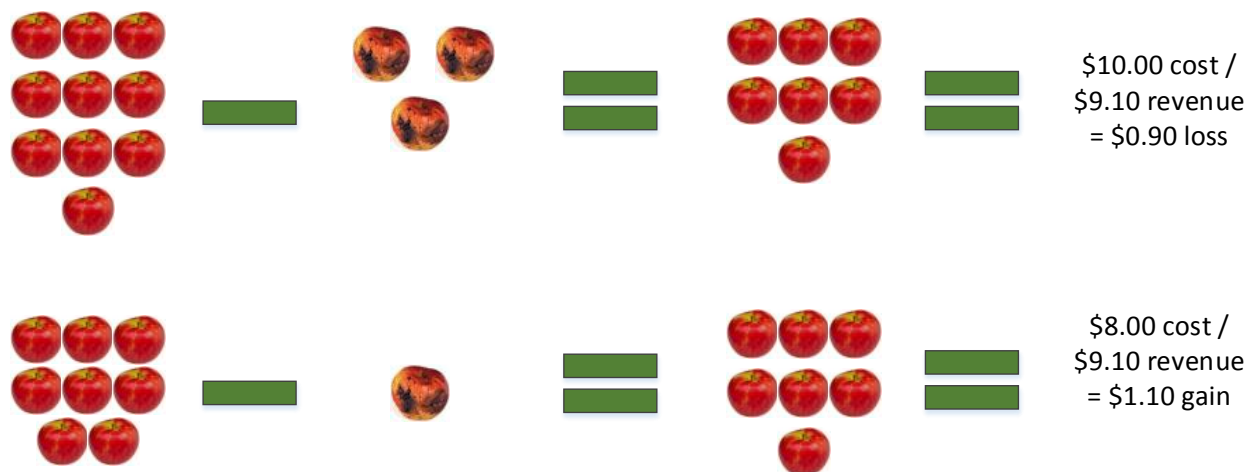
Presented below in Figure 5-2 is a simple apples-to-apples comparison that shows why our industry's obsession with volume should be considered a false economy. Industry needs to break away from a belief that volume is king. Volume can be to a business's detriment.

Figure 5-2: Why Less Can Be More

The calculation in the first apple imagery shows that if a farmer were to produce less product but of a higher quality, and thereby produce less waste, the financial outcome would be greater than if he/she were to produce more with greater waste.



Taking this scenario further along the chain: if a business purchased ten products at a cost of \$1.00 each and was only able to sell seven, with a markup of 30 percent, the business would lose \$0.90. If the same business purchased eight of the same products at \$1.00 each and lost just one, with a markup of 30 percent, it would make a profit of \$1.10 profit. This equates to a \$2 differential — before any costs associated with the handling and disposal of wasted items are factored in.



5.1 Calculating the True Cost of Waste

Our 2010 estimation of food waste analyzed only one component of food waste: the food itself. From an industry perspective, FAO¹⁸ states that the value of food wasted represents only 29 percent of the true cost of food waste. **This would mean that the true cost of \$31 billion of wasted food really equates to \$107 billion.**

As presented below in Figure 5-3, businesses will try to factor the cost of food and associated wastes when determining prices. The buyers will try to factor the costs of food and associated wastes into payments flowed to their suppliers. The comparative power of buyers and suppliers will determine the extent to which they can factor the cost of these wastes into their financial dealings.

Figure 5-3: Factoring Waste into Prices Paid

$$P_b = P_s - (\text{waste/per unit} + \text{labour/unit} + \text{all additional})$$

P_b = price paid by buyer

P_s = price charged by seller

Commonly, 38% or more of the true cost of food waste comes from the labour involved.

The highest levels of waste occur in fruit, dairy, meat and poultry, vegetables, and bakery.

While these costs are factored to differing degrees into their pricing and payment systems, businesses typically only consider the costs of food waste¹⁹ as they relate to its disposal, either in transport, donating to food banks, bio-digestion, or landfill charges. However, in a study of hospitality and foodservice, WRAP^{iv 20} estimated that these considerations accounted for just 3 percent of the true cost of food waste. Commonly, 38 percent or more of the true cost of food waste comes from the labour involved in handling, preparing, and disposing of food that goes to waste.

Analysis of data provided by three retailers, who account for 65 percent of the UK grocery industry,²¹ identified that the highest levels of waste occur in fruit, dairy, meat and poultry, vegetables, and bakery. The average cost of this waste was over £2,290 (\$3,660 at exchange rate of 1.6) per tonne. This was only for food that was dumped and did not include associated costs. WRAP²² calculated that the average cost of UK food waste across all categories was typically around £950 at the processing level, rising to an average minimum of £1,200+ at retail (\$1,520 and \$1,920, respectively).

^{iv} WRAP (Waste & Resources Action Programme) is an independent not-for-profit organization in the UK. It works with businesses, individuals, and communities to help them reduce waste, develop sustainable products, and use resources efficiently.

The highest per tonne cost was incurred by hotels.

WRAP²³ identified that the average cost of avoidable food waste in the UK foodservice and hospitality sector was £3,700 (\$5,920) per tonne. The highest per tonne cost was incurred by hotels, followed by restaurants. Experts from the Canadian industry told us that hotels in particular overcome this cost by “simply charging consumers more.”

A 5% reduction in food waste would save the UK foodservice and hospitality sector £125 million per year.

The same WRAP study also cited that a 5 percent reduction in food waste would save the UK foodservice and hospitality sector £125 million (\$200 million) per year. Ireland’s STOP Food Waste program calculated that businesses can save €2,000 to €5,000 (\$2,800 – \$7,000 at exchange rate of 1.4) or more for every tonne of food waste prevented.²⁴

6 Relationships

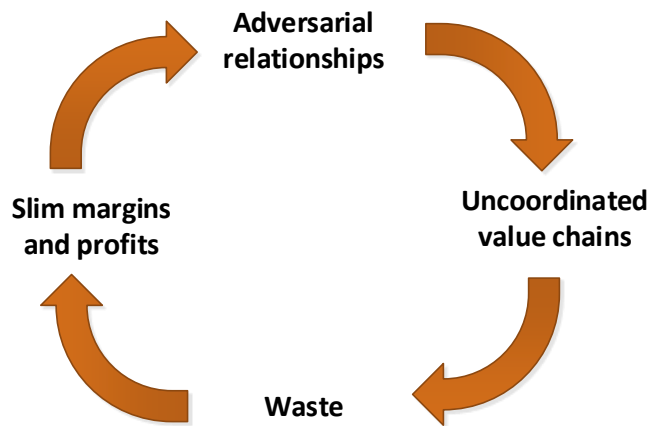
Our extensive work with clients in the agriculture, food, and beverage industries, and our research into the determinants of business performance have led us to conclude that the relationships which exist within and between businesses in a value chain have the greatest impact on long-term profitability.

Relationships have the greatest impact on long-term profitability.

The impact of these business relationships on food waste and associated costs is best explained when looking at commerce from a value chain perspective. We use the term “value chain” (rather than “supply chain”) because it reflects the fact that businesses’ success relies on creating consumer-recognized value.

Adversarial relationships that typify the agri-food industry result in slim margins and profitability.

Who causes and pays for the costs associated with food waste is a contentious issue. It strains already adversarial relationships, further increasing businesses’ unwillingness to share information and work collaboratively. For example, why risk providing buyers with ammunition that they may in turn use against you when next negotiating price? Figure 6-1 shows why the reiterating adversarial relationships that typify the agri-food industry result in slim margins and profitability.

Figure 6-1: The Reiterating Cycle That Negatively Impacts Profitability

The ability to establish close constructive relationships with other businesses relies on businesses first establishing strong internal relationships. Never have we seen or heard of a business that has an internal culture of adversarial competition and distrust having established robust highly effective relationships across its customer and supplier base. That is not to say that businesses possessing strong trusting internal relationships always enjoy superior relationships with all suppliers. It takes two to tango.

6.1 Determinants of Performance

Our research has shown that the relationships that exist between businesses fall into four categories: fragmented, cooperative, coordinated, and collaborative (see Appendix C for detailed descriptions).

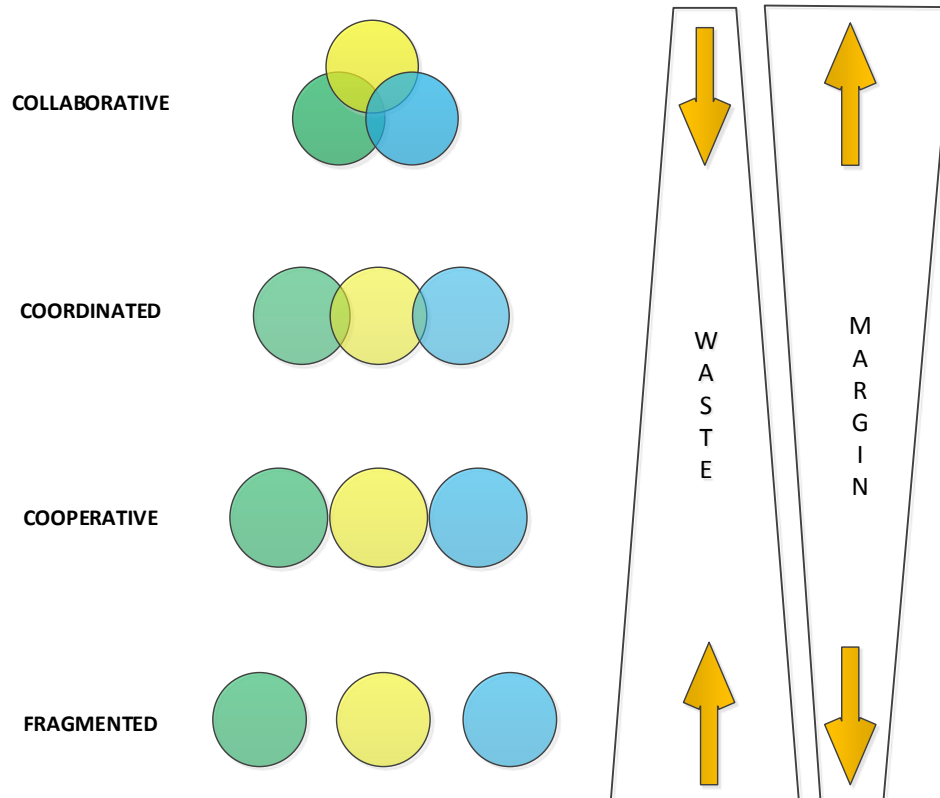
The most profitable and sustainable businesses are those that are able to create unprecedented levels of consumer-recognized value more effectively and efficiently than their competitors. This comes from them having implemented systems and processes that enable them to continually improve profitability and competitiveness in relation to the end market. This is an iterative process (i.e., it never stops). Over time, from having proven their commitment and ability to work together to achieve a common vision, strong relationships form between the involved businesses. Close proactively managed relationships is the glue that holds exceptionally successful value chains together. Those same relationships motivate and enable the involved businesses to continually improve their performance beyond what would otherwise be possible. This combination of strong relationships and closely aligned operations determines a chain's structure. It also determines the performance of the involved businesses and the opportunities that lie before them.^v

^v For a fuller explanation of the determinants and outcomes of the four categories of business relationships, click on [link A](#) and [link B](#) to access applicable reports.

6.1.1 Comparative Performance

As we cannot present actual figures for reasons of confidentiality, we present a comparative framework that we developed in 2011 to communicate differences between the waste experienced by businesses sharing extremely strong, trusting, constructive relationships versus those that do not, and the comparative impact on performance. These differences are presented in Figure 6-2.

Figure 6-2: Impact of Chain Characteristics on Food Waste and Profitability



6.1.2 Demand Amplification

Since the 1950s, it has been recognized that demand amplification^{vi} leads to unnecessary levels of waste and can impact businesses' profitability by over 50 percent. Critically for the food industry, the more perishable the product, the greater the impact demand amplification has on profitability. The longer and more complex the chain, the greater the impact of demand amplification from a

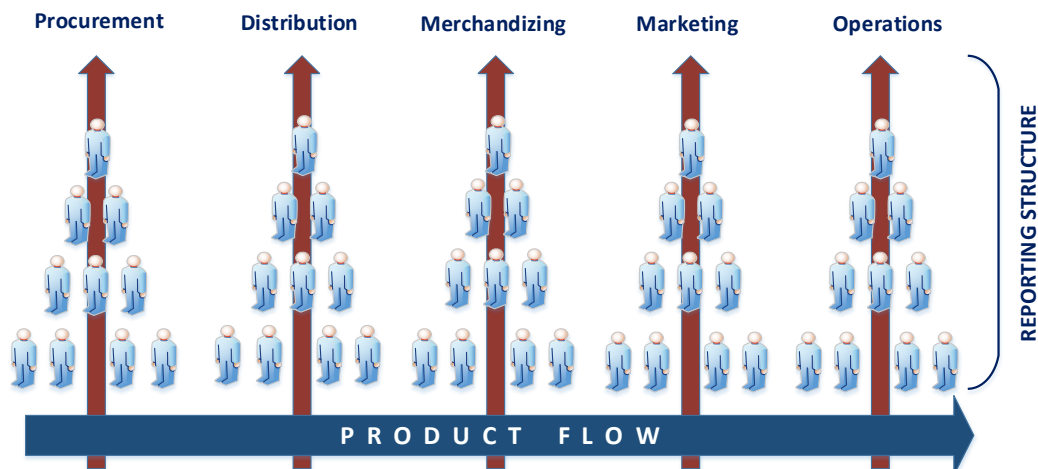
^{vi} Demand amplification (often called "bullwhip effect") describes the extent to which changes in demand and supply are magnified the further away from the end market that a company operates. The causes for these swings include the aggregation of orders; individuals over compensating when placing an order, or planning production due to not having access to the full array of information required to make informed timely decisions; and production cycles.

financial (and environmental) perspective. This is just one reason why a correlation exists between the level of food waste through a chain and how closely (or not) a chain is aligned.

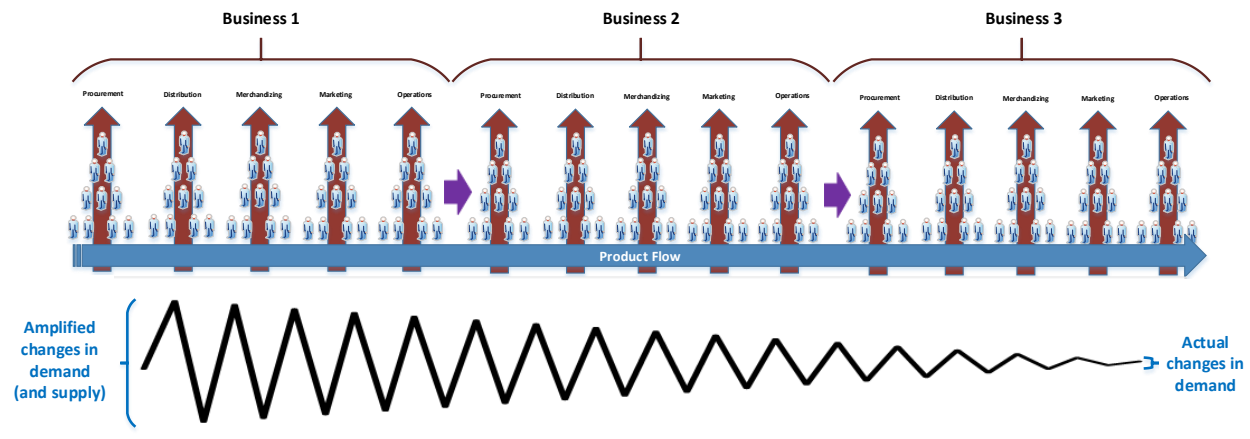
The primary cause of demand amplification is a lag between information and material flows along the value chain, often due to individuals' inability (or lack of motivation) to share information or act upon information in the most effective way possible.

A key reason why businesses find it difficult to establish close trusting and constructive relationships is illustrated below in Figure 6-3. The internal reporting and coordination mechanisms that determine how a business is managed are arranged vertically, while the activities that determine business performance and profitability occur horizontally. This mismatch produces a reiterating internal culture characterized by competition, adversity, and distrust between individuals and functions. This leads to individuals apportioning blame at those operating at different levels and within different departments. Seeking to continually improve performance by developing then implementing increasingly sophisticated solutions is simply not on the cards.

Figure 6-3: Impact of Vertical Reporting and Coordination on Horizontal Processes



Extend this scenario across multiple businesses (see Figure 6-4 below) and the true impact of businesses being vertically-structured in relation to product flow comes into view.²⁵ Enormous waste and unnecessarily high cost structures result from individuals and entire departments lacking the incentive to ensure operations are correctly managed in relation to consumer demand.²⁶

Figure 6-4: Demand Amplification along the Value Chain

Extensive research conducted by the Food Chain Centre, SA Partners, and VCMI, amongst others, shows that the food industry trails other industries in the extent to which it has embraced approaches explicitly designed to reduce factors such as demand amplification.²⁷ It also shows that the waste that occurs along a value chain can equate to 10 to 20+ percent of prices paid by consumers²⁸ and can be greater than the collective margin of all of the involved companies!²⁹

Businesses that have found a means of balancing the vertical and horizontal determinants of success enjoy superior profitability and more sustainable competitive advantage.³⁰ This is particularly true in agriculture and food, an industry that is characterized worldwide by adversarial relationships, distrust, and short-term opportunistic behaviour.³¹ Similar factors characterize the seafood industry.

The weaker the business relationships, the more likely it is that their behaviour will exacerbate the existence and impact of demand amplification, resulting in unnecessarily high costs. Resentment and distrust develops between the involved businesses, each blaming the other for having created the problem.

“Consumers are busy picking off deals, while retailers and suppliers are busy picking off each other.” (Industry expert)

Price promotions also diminish the value that consumers place on food and purposefulness of their shopping behaviour. The ingrained behaviour of offering short-term specials to consumers creates unnecessary and enormous variations in demand. In the words of an expert who possesses considerable experience in the Canadian food production and retail sector: “Consumers are busy picking off deals, while retailers and suppliers are busy picking off each other. This produces enormous amounts of food waste and is unsustainable.”

6.2 Claims and Allowances

A common practice that perpetuates the adversarial relationships which typify less collaborative interactions within the food industry (resulting in unnecessarily high cost structures and slim margins) is claims and allowances.

The term “allowances” is given to the practice of charging suppliers a fee to absorb costs associated with the disposal of food waste.

The term “allowances” is given to the practice of charging suppliers a fee to absorb costs associated with the disposal of food waste. While the concept is sound, it is open to abuse. That abuse occurs for two main reasons.

First, charging allowances to suppliers lessens businesses’ accountability for their role in the creation of food waste, because allowances are charged regardless of the cause of the waste. For example, it does not matter how sophisticated a supplier’s processes are for delivering a top quality item if it is damaged by a part-time retail worker, who has received little training or simply does not take care in his/her work.

Second, allowances can provide a revenue stream against which suppliers have little recourse. During a confidential interview, we were told that if a retailer imposes an allowance or penalty based on industry averages and the supplier’s waste is lower, the retailer benefits accordingly. If waste rises beyond the anticipated level, the retailer penalizes suppliers further. It was disclosed that retailers typically provide only vague information into what waste occurred where or why, and at times months after the fact. This means suppliers have little opportunity to identify root causes and proactively work to reduce waste within their own organization or with their chain partners.

Retailers should not, however, be castigated as pariahs. Retail waste can be exacerbated by manufacturers and distributors who push product to the market, either in unexpectedly high volumes or of unacceptably low quality. This can happen when businesses possess a myopic belief that success relies solely on minimizing per unit production cost. We have seen and heard of instances where food processors and distributors penalize their suppliers to compensate for their own internal inefficiencies.

Farmers can ultimately suffer the most from this practice of penalizing suppliers up the chain. They can also be impacted the most by the lack of coordination that exists along many value chains. Their costs are borne across 100 percent of production. Their revenues to varying degrees are determined by the percentage of harvested crops sold to consumers, along with the chain’s effectiveness and efficiency. This is not to say that all the financial problems faced by farmers lie at the feet of manufacturers, distributors and retailers; they do not.

7 Implementing Processes to Reduce Food and Associated Waste

The 2013 “Cut Waste, GROW PROFIT™”^{vii} report described a problem-solving framework that the VCMI team has used on numerous occasions to help businesses benefit financially from reducing food and associated waste. The purpose of the approaches described in that report, some of which are reiterated below, is to enable businesses to focus their efforts on areas that will produce the greatest return on investment.

Achieving a 20% reduction in costs and the equivalent of a 5 to 12% increase in profitability is entirely feasible.

Adopting a whole of chain approach will unequivocally produce greater opportunities and benefits than if focusing on an individual business or department within a business. Achieving a 20 percent reduction in costs and the equivalent of a 5 to 12 percent increase in profitability is entirely feasible, particularly in highly perishable segments such as produce.³² Projects completed by the VCMI team and others have shown that waste reduction initiatives can also produce increases in revenue.³³

Abiding by a relatively small number of factors will help ensure that your initiatives are successful. They will also help ensure that your project is manageable by breaking it down into bite size chunks, and will produce the momentum required to sustain the initiative over the long term.

Food waste is a symptom of issues that are typically not easy to observe and never occur in isolation.

In whole of chain approaches it is important to include individuals from multiple functions and from business operating along the value chain. Remember that food waste is a symptom of issues that are typically not easy to observe and never occur in isolation. Therefore, do not focus only on food waste per se.

The starting point is to quantify a problem or issue in easily communicated terms, and identify businesses that you can partner with to improve the value chain's performance. Then, with key individuals from those businesses, determine the purpose of the project. In which category and where in your businesses do the issues or problems that you are seeking to address occur? What is the current situation? What will you be seeking to achieve and why? What are the estimated opportunities? What will success look like? This information will enable you to rally people around a cause and get buy-in.

^{vii} [2013 “Cut Waste, GROW PROFIT™” Report](#)

The next step is to form a working group that comprises individuals who possess skills and capabilities which you believe necessary to achieving your objectives. Ensure that you have the full support of key senior management and executives from the involved businesses. They will be your sponsors, playing a vital role in enabling you to overcome challenges that at some point during the research and implementation you will almost certainly encounter. They can also assist you to access the required resources.

Be very careful to only involve the correct individuals.

Throughout the initiative be very careful to only involve the correct individuals. It is typical for businesses to have within their ranks individuals who feel challenged or threatened by waste reduction initiatives, because they believe that it may undermine their authority or place them in a bad light. If you decide to involve such individuals in your project team, ensure that they are not placed in a position where they could undermine the purpose of the initiative or limit its achievements.

Carefully scope the project from a 30,000-foot perspective.

Armed with the information described above and the support of a working group comprising individuals from the businesses that together form the value chain in which the initiative will occur, carefully scope the project from a 30,000-foot perspective. At this point, we recommend that senior representatives from the involved businesses discuss how they expect improvements in financial performance to be shared. This is more about managing expectations and forming a foundation upon which to establish committed trusting relationships than dividing dollars and cents.

The project team's first meeting should focus on defining what they would seek to achieve.

The project team's first meeting should focus on defining what they would seek to achieve and how in more detail than previously possible. WRAP has produced excellent overviews of how to conduct the project team's first meeting and produce outcomes that enable the production of an early stage project charter.^{viii} VCMI produced a workbook to guide you through the process of improving chain performance by reducing waste.^{ix}

Simply involving individuals who possess different perspectives and skills in a focused discussion on waste is likely to produce insights into potential quick wins. Quick wins play an important role in maintaining initiatives' momentum; therefore, celebrate them with the team and communicate the results across the participating businesses whenever possible.

^{viii} For example: ["Toolkit for fresh produce."](#)

^{ix} VCMI workbook: ["Value Chain Management Workbook"](#)

The most effective project charters define anticipated opportunities, improvement targets, and timelines. They also detail the required resources (personnel, financial, etc.) that are expected to be required, the cross-company group who will be charged with implementing the initiative, and an effective communication system. Ideally they will also detail who is going to coordinate the initiative, along with how individuals will be made responsible and accountable for fulfilling their roles.

Defining opportunities and targets in greater detail begins by mapping the value chain.

Defining opportunities and targets in greater detail begins by mapping the value chain. This can be a challenging process. Commence by drawing a conceptual map of what activities occur along the value chain, where the team believes improvement opportunities lie, and what evidence exists to suggest the size of opportunities. This information provides the why factors that businesses and organizations need to know before they will commit the resources required to maintain a concerted initiative.

It provides the opportunity to determine what data can be gathered to objectively diagnose performance through measurement.

Armed with a conceptual map and the required resources, the project team can physically walk the value chain to observe activities and visible evidence of waste. Invariably you will identify more quick wins. It also provides the opportunity to determine what data can be gathered to objectively diagnose performance through measurement. This is critical to identifying relationships between activities and issues occurring at multiple points along the value chain, and to begin identifying root causes. The time required to gather and analyze data will depend on the suitability of systems already in place.

Insights from physically walking the chain will enable the project team to begin prioritizing where the greatest opportunities lie according to a number of factors, including estimated ROI. The generation of measurable data will enable you to propose solutions and action plans, then implement and monitor the effectiveness of pilot studies with greater precision than otherwise possible. Measurable performance data is also critical to expanding pilot projects across the wider businesses and value chain, and embedding change. It will likely also lead to the team identifying future more ambitious longer-term opportunities, potentially in other areas of the involved businesses.

8 Conclusion

In an industry typified by slim margins and profitability, all businesses should embrace the financial opportunities available to them from reducing avoidable food and associated waste. Food and associated waste costs businesses money. It also increases the cost of food to consumers. From environmental and societal perspectives, avoidable food and associated waste costs everybody.

The financial benefits of reusing or preventing food waste from going to landfill are typically a fraction of those benefits available to businesses that work to prevent avoidable food waste from occurring in the first place. Rather than viewing food waste as THE problem, it should be recognized as a symptom of an uncoordinated value chain. Adversarial relationships that typify the food industry are a primary cause of fragmented and uncoordinated value chains.

Experience and research confirms that businesses which are part of a robust and closely aligned value chain are more likely to have implemented processes to reduce avoidable waste. They are also the companies that consistently experience higher margins and profits.

It takes time and can be challenging to transform distrusting relationships into committed partnerships that possess the capabilities required to continually improve performance. The rewards, however, speak for themselves. In today's hyper-competitive food industry, few opportunities exist for businesses to reduce operating costs by 15 to 20 percent and increase profitability by the equivalent of 5 to 11 percent. Addressing food waste is a clear opportunity for businesses to be more profitable and to actively contribute to a more environmentally and socially responsible world.

8.1 Five Key Takeaways

1. Canada's annual quantifiable food waste cost is \$31 billion.
2. The true cost of food waste in Canada is \$107 billion.
 - a. This is calculated by taking United Nation's Food and Agricultural Organization's estimation of the value of food wasted representing only 29 percent of the true cost.
3. For businesses – the total cost of waste along a value chain can exceed the combined margins of the involved companies.
4. For consumers – avoidable food waste can increase the cost of food by 10 percent or more.
5. Through reducing food waste, businesses can reduce operating costs by 15 to 20 percent and increase profitability by the equivalent of 5 to 11 percent.

Appendix A — Methodology

Accurately quantifying the economic, environmental, and social impacts of food waste is such a challenge that no researcher has claimed that he or she knows its exact value. Our estimates have been produced from analyzing existing data (e.g., Statistics Canada) and our communications with commercial industry. This enabled us to prove once again that food waste is an immense issue and can be reduced significantly. It presents an enormous opportunity for businesses.

Following the methodology described below, we found that the value of food wasted in Canada increased by 15 percent between 2010 and 2014 to reach \$31 billion. This percentage increase stems from new knowledge and insights that were not known to us in 2010. These include figures surrounding seafood from capture through to processing and a portion of the international catering waste (described below) that we are confident in reporting. The increase is not due to any measurable changes within the sectors that we analyzed in 2010.

This revised estimate is based on consultations with industry stakeholders, along with additional secondary information. The industry stakeholders advised us of the following with regards the average percentage of unrecovered waste from field to retailers:

- Average waste at the field is 5 percent of the volume produced. However, the waste at the field varies greatly from one crop to another. Waste at the field is minimal in grain production and is about 10 to 15 percent in fruit and vegetable production.
- Average waste during processing and/or packaging is 10 percent.
- Average waste during transportation and distribution is 2 percent.

We consider the above percentages of waste as lost sales. In order to calculate the value of waste from field to retailers, we multiplied the above percentage of waste by sales of agricultural and seafood products in 2012, which was estimated at \$61.7 billion (\$57.2 billion for the sale of agricultural products³⁴ and \$4.5 billion for the sale of seafood products³⁵).

The average percentage of waste at restaurants was estimated based on consultation with industry stakeholders, who advised us that a well-run restaurant operation would have no more than 5 percent of food wasted. This would account for normal breakage, spills, overcooked food, etc. Per diner food waste in restaurants has been measured at 0.5 kg.³⁶ Uneaten food is therefore estimated to account for a further 5 percent. We calculated the value of 10 percent waste at restaurants by multiplying this percentage by \$29.4 billion^x — the amount Canadians spent on food purchased from restaurants in 2011.

^x Number of households (13,320,615) in 2011 times average household spending (\$2,207) on food purchased from restaurants in 2011 (Source: Statistics Canada, 2014)

Based on industry statistics provided to us confidentially, it is realistic to estimate that food waste in the retail sector (distribution centres and retail stores) amounts to \$3 billion.

International catering waste (ICW) – waste produced by airlines, cruise ships, merchant ships, yachts, cross-border trains, and the military – is stated as being the highest per capita source of food waste. While the incidence of ICW is considerably less than other sources, the contribution of ICW to food waste cannot be ignored. Unfortunately, there is no secondary data/information on this category with the exception of airlines. In 2012, there were 23.6 million international passengers.³⁷ This does not include travel between Canada and the United States. Assuming that two meals are served on the international flights and 10 percent could be saved, that accounts for 4.7 million wasted meals. Considering each meal and service is worth 10 dollars, the value of wasted meals on international only flights is estimated at \$47 million.

According to Statistics Canada,³⁸ “In 2007, the loss of solid food was estimated at more than 6.0 million tonnes between the retail level and the plate — the equivalent of 183 kg per person. Another 2.8 billion litres of liquids, including milk and milk products, coffee, tea, pop and juices, were also wasted. These losses do not include losses at the production level or during food processing.” Considering Canada’s population growth between 2007 and 2014, the numbers could be aggregated and translated into dollar value.

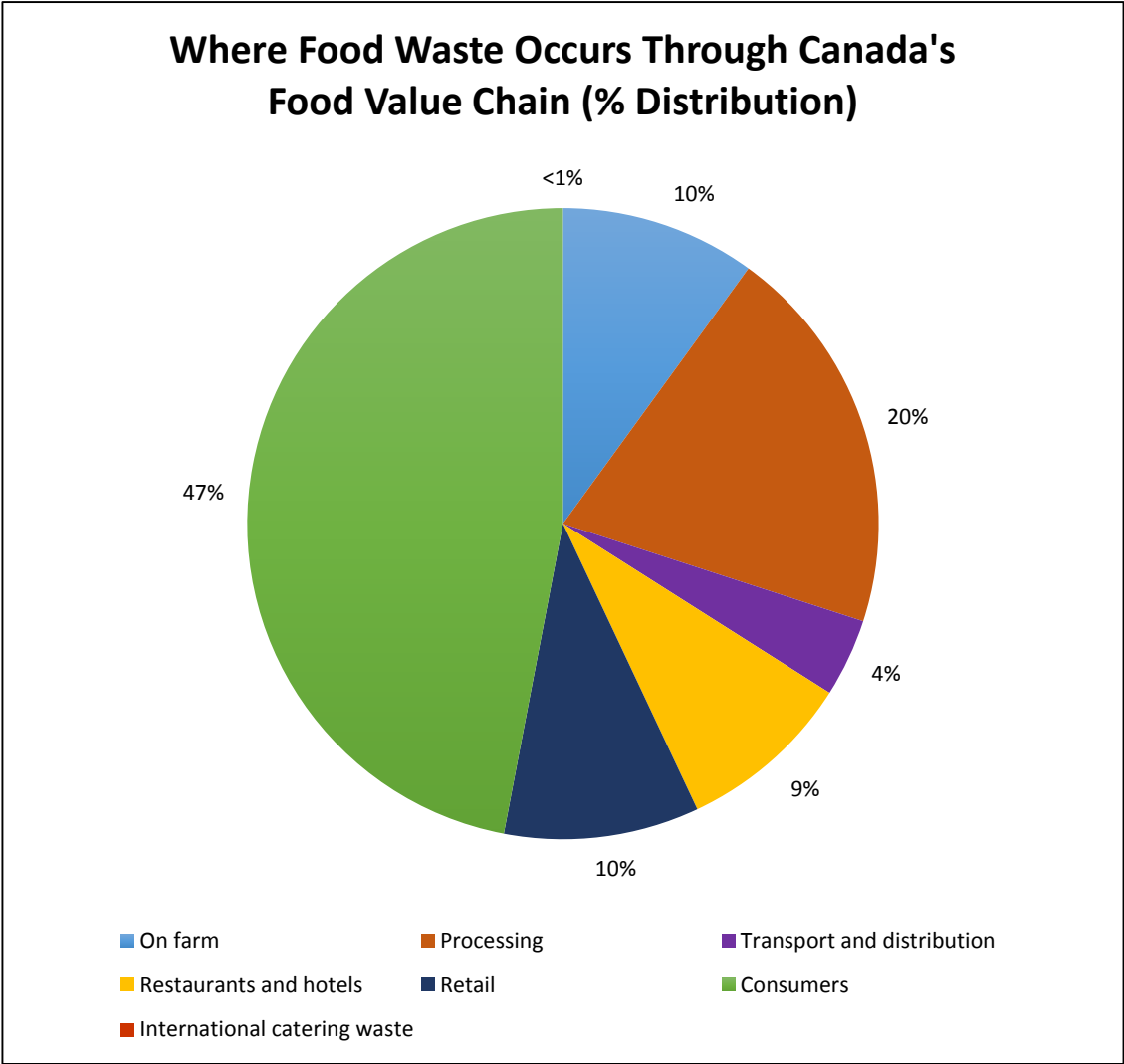
Our calculations of food waste in the home were based on Canada’s population of 35.5 million³⁹ and the previously estimated 183 kg of solid food and 84.6 litres of liquids being wasted per person. The cheapest kilogram of solid food is estimated to be approximately \$2 per kg and the cheapest litre of liquid \$0.5 per litre. This translates to the minimum value of such waste from retail to plate equating to \$14.5 billion.

Food waste in institutions (e.g., hospitals, schools, prisons, orphanages, etc.) is not included in the calculation, but is discussed in the paper because it is believed to be significant.⁴⁰ Reasons for the high levels of food waste said to occur in institutions, such as hospitals, include the “free-loader” effect — if someone does not explicitly pay for a product, they are likely to treat it with less care. Other reasons include a polarized perspective on reducing the cost of producing meals.

The real cost of food waste is considerably higher than \$31 billion. The United Nations’ Food and Agriculture Organization (FAO)⁴¹ estimated that the value of food wasted represents only 29 percent of the true cost of food waste. If FAO figures are used to scale up the value of food wasted in Canada, the quantifiable true cost of food waste in Canada would be \$107 billion.

FAO’s classify the cost of food waste into two major groups: quantifiable and unquantifiable. The quantifiable costs of food waste include the value of food wasted, and the environmental and social impacts. The unquantifiable cost of food waste include various elements, such as the losses of wetlands, biodiversity of pastures, and the value of fish discarded, as well as the scarcity of essential agricultural inputs and the increase in food prices because of less supply.

Where Food Waste Occurs Through Canada's Food Value Chain (% Distribution)



Appendix B — VCMI's Bibliography on Food Waste

This is our fourth report on food and associated waste. It shines a new perspective on the topic of food waste. It does this by discussing the true cost of food waste and showing why tackling food waste presents a financial opportunity to just about every business operating in today's complex agri-food industry. Numerous businesses are redesigning their supply chains so that they can benefit financially from addressing the causes of food waste and compete more effectively in the face of increasingly onerous challenges.⁴² Reducing food waste also presents a financial opportunity to consumers.

The following is a summary of our first three reports (links to each report are included in the footnotes):

1. **"Food Waste in Canada" – November 2010**^{xi}

Our first report, "Food Waste in Canada," published in November 2010, estimated the cost of food waste on the Canadian economy and placed it in easily communicated terms. Our estimation at that time of \$27 billion is greater than the value of all Canada's agricultural and agri-food imports in 2007. It is also greater than the combined gross domestic product (GDP) of the world's 32 poorest countries for 2009.

That first report also described why food miles and plastic packaging are not necessarily the demons that they are purported to be from an environmental perspective. Local food can produce higher levels of waste and negatively impact the environment more than food produced in large scale operations, especially given the relatively small contribution that distribution has on the creation of greenhouse gas.

Plastic packaging can play an important role in reducing food waste, by extending shelf life and maintaining quality beyond what is otherwise possible. The downside of packaging is often not the material itself; rather it is the lack of coordination that exists in industry and between municipalities on how to manage packaging and distribution from a life cycle perspective.

2. **"Cut Waste, GROW PROFIT™" – October 2012**^{xii}

Our second report, published in October 2012, marked the launch of the "Cut Waste, GROW PROFIT™" initiative. This report brought the environmental impacts of food waste to the fore. When food is wasted, it not *just* food that is lost. The water, energy, labour, machinery wear, transportation, and other resources invested in the production, processing, and delivery of those goods are wasted too. All of these factors create an economic cost to businesses and consumers. They also create enormous environmental costs. Parfitt *et al* (2010) estimated that the CO₂ impact

^{xi} ["Food Waste in Canada" – November 2010 Report](#)

^{xii} ["Cut Waste, GROW PROFIT" – October 2012](#)

of food waste is in excess of 20Mt. Hall *et al* (2009) estimated that the average US farm uses 3 kcal of fossil fuel energy to produce 1 kcal of food, and that wasted food accounts for an estimated 300 million barrels of oil per year. One thousand two hundred and thirty-two gallons of water are used to produce one 8 oz. steak.⁴³ Add to this the fertilizer, medications, land, and chemicals used in the production of food that is wasted. The report also presented concrete examples of how businesses have benefited financially (including to the tune of millions of dollars) from reducing food waste, and how consumers can markedly reduce the money that they spend on food.

3. “Cut Waste, GROW PROFIT™ - Food and Associated Wastes” – May 2013^{xiii}

The subsequent May 2013 “Cut Waste, GROW PROFIT™ - Food and Associated Wastes” report expanded on how businesses can benefit financially from reducing food and associated waste. It achieved this by providing specific examples of how the food industry can increase the effectiveness of its operations. It also provided a framework that businesses use to identify and capture opportunities.

Examples given of the scale of opportunities to improve performance included how improving the feed conversion of Canadian beef cattle could save the equivalent of one million tonnes of grain annually. Feed costs is one reason that choosing genetics for their “fit for use” could reduce beef farmers’ production costs by 40 percent, perhaps more. The same factors that increase producers’ production costs also impact downstream business, such as processors, from forcing them to manage variations in carcass composition.

The report also described why businesses are not addressing the challenge of food waste as well as they might. Reasons include Canada’s not having a high profile industry-wide initiative such as UK’s WRAP (Waste & Resources Action Programme), and how the lack of support provided by senior managers and executives discourages individuals from addressing food waste issues, even when they are in plain sight.

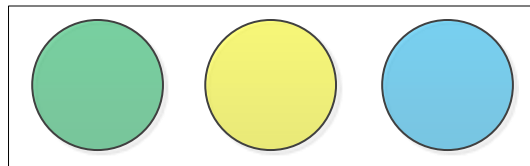
^{xiii} [“Cut Waste, GROW PROFIT – Food and Associated Wastes” – May 2013](#)

Appendix C — Four Categories of Chain Structures and Operations

While it is unlikely that a specific value chain would fit neatly into one of the structures presented below, the categories provide a useful method of determining the comparative benefits and challenges associated with each structure.

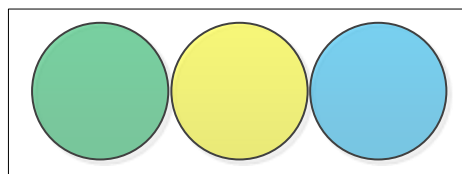
Fragmented

In a fragmented relationship, business decisions are entirely transactional, with price, volume, and personal benefit being at the forefront of the decision-making process. The majority of business is conducted as a series of short-term or one-off transactions. To ensure that they are paying the minimum price possible, customers will play suppliers off against each other. Any feedback that customers provide suppliers on the performance of their products is limited to complaints and credit claims. Regardless of whether individuals are interacting with those from within the same business or another business (most likely a supplier or customer), the focus is on “command and control.”



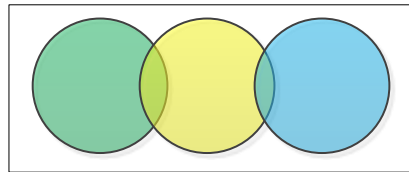
Cooperative

In a cooperative relationship, businesses decisions reflect a level of understanding that *cooperating* with one another over the medium term, rather than sticking to short-term or one-off transactional arrangements, is the preferred option. Individuals from across the involved businesses (e.g., procurement and merchandizing) will communicate with each other, though the existence of a rigid hierarchical management system in one or more of the businesses limits individuals' desire or ability to act. This dichotomy between weak internal relationships and strong external relationships undermines the opportunities that exist for the involved businesses' ability to reduce costs and increase revenue.



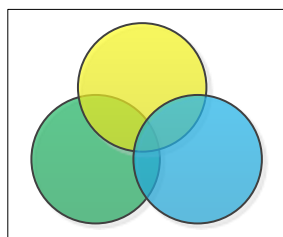
Coordinated

In a coordinated value chain, companies possessing complementary attitudes, cultures and leadership styles choose to *coordinate* their business arrangements over a short to medium timeframe. Operating from an operational and more strategic perspective leads to a greater sense of inter-dependence developing between the businesses. People from different areas of multiple businesses start communicating with each other more often. For example, a group of farmers may simultaneously meet with individuals from the procurement and marketing/merchandising departments of both the processor and the retailer to discuss challenges and opportunities. Discussions on how they can proactively work together to solve challenges and secure opportunities, and what success looks like, leads to businesses gaining valuable insights into the operations and requirements of their customer's customer(s). "One-up, one-down" business dealings are replaced with "two-up, two-down" business dealings. As businesses' commitment to the partnership grows, so does the development of more sophisticated management capabilities.



Collaborative

In a collaborative value chain, companies engage in longer-term strategic arrangements that involve *collaboratively* sharing resources and/or investing in the capabilities required to achieve mutually-beneficial outcomes. Successfully adopting this type of model requires the involved businesses to possess compatible cultures, vision, and leadership. It also requires that the involved businesses be passionately committed to responding to market demands in the most effective and efficient way possible. In a collaborative value chain, the only systematic activities that will occur is the route that products take to market. Communication, the exchange of information, along with the creation and application of knowledge occur systemically across and within all of the involved businesses. That this exchange of communication always occurs in relation to target consumers' perceptions of value results in the involved businesses' possessing unprecedented capabilities and the ability to innovate in ways that are very difficult (if not impossible) for competitors to replicate. That financial rewards are equitably shared across the involved businesses motivates them to identify opportunities to improve each other's performance.



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