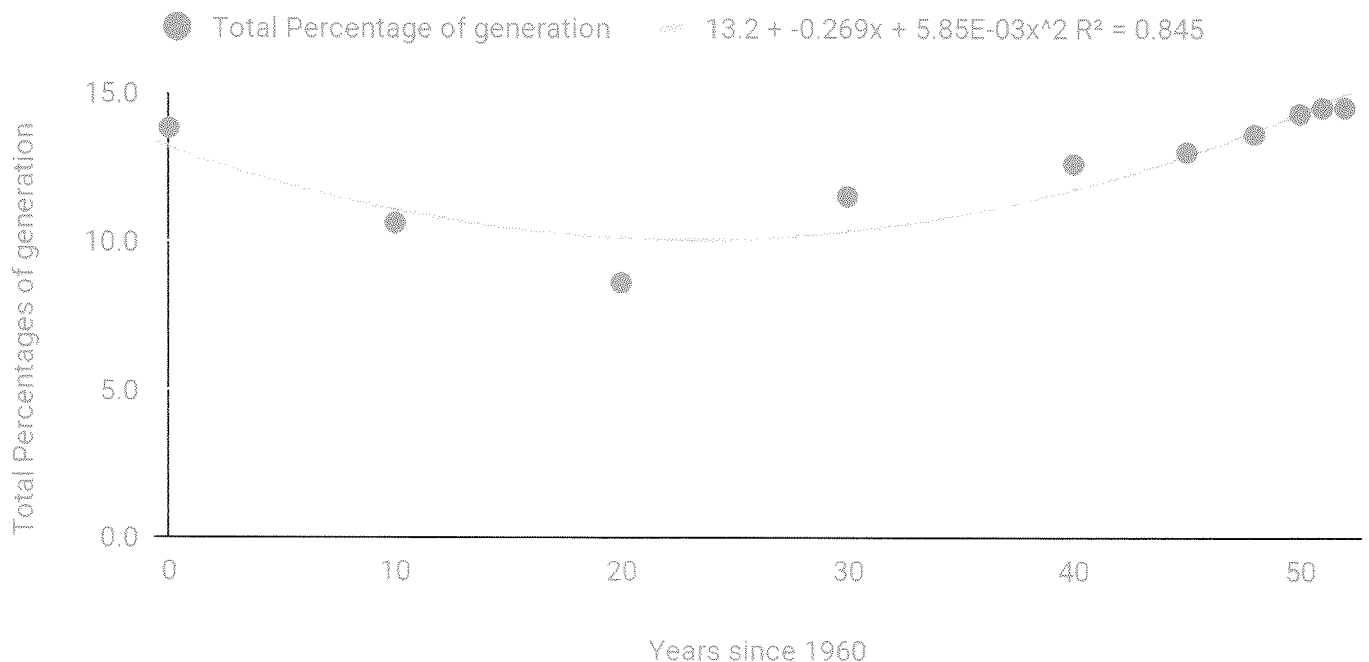


DATA ANALYSIS SUMMARY

Food Waste

BY Saul Diaz- Cruz

Percentages of Food Waste generated in the Municipal Waste Stream from 1960-2012



Percentages of Food Waste generated in the Municipal Waste Stream from 1960-2012. The figure shows that during the points on the x-axis between the years 1960-1990 there's a decrease happening then it begins to increase in the year of 2000. The three points at the end of the line remain constant/steadily the same. The last data point that you can see is in 2012 and it seems like this stays at the value of 14.5% just like the data point in 2011 which comes right before it. Based on the regression equation, the value of the data in this first set in the year of 2019 is 17.5% and this prediction is realistic because just like the second data set the last year was in 2012 and from there you would count up from 52 to 59. Furthermore, The predictions mean that in the future of the data, this correlation will continue to increase and not decrease so it will stay as a positive or strong coefficient as in the linear R^2 value which is 0.944. The predictions that were made seem to be reliable using the quadratic equation ($13.2 + -0.269x + 5.85E-3x^2$) which has an R^2 value of 0.845. If this data shows that the correlation will continue to increase and not decrease then the line will stay as a positive or strong coefficient. This means that the predictions that are made will affect the future of the data.

Data Analysis Project Checklist:

My Topic: Food Waste

When you have completed a step, right click on the check box and select the check mark. Then write the date completed and have Mrs. Alfuth or Ms. Macko initial.

- ✓ Part 1: Gathering Data Date completed: 3/12/19 Teacher Initial _____
 - ✓ Data sources found and **Part 1 - Gathering Data** complete on Google Doc
 - ✓ Data entered in the spreadsheet
- ✓ Part 2: Scatter Plots and Observations Date completed: 3/14/19 Teacher Initial _____
 - ✓ Scatter Plots created in the spreadsheet
 - ✓ Observations section **Part 2 - Scatter Plots and Observations** in Google Doc complete
 - ✓ Peer review of scatter plots complete
- ✓ Part 3: Regression Equations, Analysis, and Conclusions Date completed: 3/18/19
Teacher Initial _____
 - ✓ Regression equations found and copied into Google Doc
 - ✓ Analysis and Conclusions complete for each scatter plot
- ✓ Part 4: Captions Date completed: 3/21/19 Teacher Initial: _____
 - ✓ The first draft of captions
 - ✓ Peer review of captions
 - ✓ Captions revised and finalized
- ✓ Final Product created and turned in Date completed: 3/22/19 Teacher Initial: _____

Part 1 - Gathering Data:

Data Set #1:

Published years available in data set: 1960-2012

Years to be used in scatter plot (minimum 5): 1960-2012

Y-variable with units: Food Waste in Thousands of tons

Source: https://www.epa.gov/sites/production/files/2015-09/documents/2012_msw_dat_tbls.pdf

Save a copy of your data as a PDF in your Algebra 2 folder by printing to PDF.

What is this data about? Write 1-2 sentences describing what the information is about in this data set. For example, *This data set is showing the national participation of students in the free breakfast program from the years 2000-2010.*

This data set is showing the thousands of tons of food waste that's being generated in the municipal waste stream from 2000-2011.

Data Set #2:

Published years available in data set: 1960-2012

Years to be used in scatter plot (minimum 5): 1960-2012

Y-variable with units: Food Waste Percentage

Source: https://www.epa.gov/sites/production/files/2015-09/documents/2012_msw_dat_tbls.pdf

Save a copy of your data as a PDF in your Algebra 2 folder by printing to PDF.

What is this data about? Write 1-2 sentences describing what the information is about in this data set. For example, *This data set is showing the national participation of students in the free breakfast program from the years 2000-2010.*

This data is showing the total percentage of food waste that's being generated in the municipal waste stream from 2005-2012.

Part 2 - Scatter Plots and Observations

On a separate google spreadsheet create your scatter plots. Click the link for a step-by-step guide on how to create a scatter plot, you can find a PDF to help [here](#).

Observations Scatter Plot #1:

- Scatter Plot Title: ***Food Waste generated in the Municipal Waste Stream***
- What is your X-Axis Variable: Years since 1960
What is your Y-Axis Variable: Thousands of tons

Words to use to describe trends:

- *Increases/decreases
- *Steadily
- *Remains constant
- *Trend/trending
- *Not/moderately/highly correlated
- *Until

- Write down AT LEAST TWO “**trends**” you see on the scatter plot. **WRITE IN COMPLETE SENTENCES.**

Two trends I see on this scatter plot is that it increases starting at 30 (the year 1990) on the x-axis. The three points at the end of the line stay steadily the same/ remains constant.

- Write down AT LEAST TWO “**wonderings**” you have about the scatter plot. **WRITE IN COMPLETE SENTENCES.**

Two wonderings I have about this scatter plot are why two of the points are not on the line and what is the unit for thousands of tons.

Peer Feedback Scatter Plot #1:

Peer Reviewer Name: Jamilla Young

HIGHLIGHT your score for each checkbox below and give an overall score.

Make sure to give your peer-specific, **kind and actionable** feedback in the comments section, especially if they have not achieved a 4.0 yet.

Learning Target	4.0	3.0	2.0	1.0
8.10: I can create polished scatter plots to convey information.	Contains ALL of: <ul style="list-style-type: none"> <input type="checkbox"/> The title is clear and concise <input type="checkbox"/> The x-axis is correctly labeled with units <input type="checkbox"/> Y-Axis is correctly labeled with units <input type="checkbox"/> The legend 	Contains 3 of: <ul style="list-style-type: none"> <input type="checkbox"/> The title is clear and concise <input type="checkbox"/> The x-axis is correctly labeled with units <input type="checkbox"/> Y-Axis is correctly labeled with units <input type="checkbox"/> The legend 	Contains 2 of: <ul style="list-style-type: none"> <input type="checkbox"/> The title is clear and concise <input type="checkbox"/> The x-axis is correctly labeled with units <input type="checkbox"/> Y-Axis is correctly labeled with units <input type="checkbox"/> The legend 	Contains 0 or 1 of: <ul style="list-style-type: none"> <input type="checkbox"/> The title is clear and concise <input type="checkbox"/> X-Axis is correctly labeled with units <input type="checkbox"/> Y-Axis is correctly labeled with units <input type="checkbox"/> The legend

	appears on the graph	appears on the graph	appears on the graph	appears on the graph
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Peer Reviewer Overall Score: 3.0 /4.0

Comments for peer:

Observations Scatter Plot #2:

- 5. Scatter Plot Title: *Percentage of Food Waste generated in the Municipal Waste Stream*
- 6. What is your X-Axis Variable: Years since 1960
What is your Y-Axis Variable: Total percentages of the generation

Words to use to describe trends:

- Increases/decreases
- * Trend/trending
- Steadily
- * Not/moderately/highly correlated
- Remains constant
- * Until

- 7. Write down AT LEAST TWO “trends” you see on the scatter plot. **WRITE IN COMPLETE SENTENCES.**

Two trends I see on this scatter plot is that during the points on the x-axis from the years 1960-1980 there's a decrease then it begins to increase in the year of 1990. The three points at the end of the line remain constant/stay steadily the same.

- 8. Write down AT LEAST TWO “wonderings” you have about the scatter plot. **WRITE IN COMPLETE SENTENCES.**

Two wonderings I have about this scatter plot are would this line be moderate, not or highly correlated and why is the blue dot marked as the total percentage instead of percentages of generation.

Peer Feedback Scatter Plot #2:

Peer Reviewer Name: Jamilla Young

HIGHLIGHT your score for each checkbox below and give an overall score.

Make sure to give your peer-specific, **kind and actionable** feedback in the comments section, especially if they have not achieved a 4.0 yet.

Learning Target	4.0	3.0	2.0	1.0
8.10: I can create polished scatter	Contains ALL of: <input type="checkbox"/> The title is clear and	Contains 3 of: <input type="checkbox"/> The title is clear and	Contains 2 of: <input type="checkbox"/> The title is clear and	Contains 0 or 1 of: <input type="checkbox"/> The title is clear and

plots to convey information.	<p>concise</p> <ul style="list-style-type: none"> <input type="checkbox"/> The x-axis is correctly labeled with units <input type="checkbox"/> Y-Axis is correctly labeled with units <input type="checkbox"/> The legend appears on the graph 	<p>concise</p> <ul style="list-style-type: none"> <input type="checkbox"/> The x-axis is correctly labeled with units <input type="checkbox"/> Y-Axis is correctly labeled with units <input type="checkbox"/> The legend appears on the graph 	<p>concise</p> <ul style="list-style-type: none"> <input type="checkbox"/> The x-axis is correctly labeled with units <input type="checkbox"/> Y-Axis is correctly labeled with units <input type="checkbox"/> The legend appears on the graph 	<p>concise</p> <ul style="list-style-type: none"> <input type="checkbox"/> The x-axis is correctly labeled with units <input type="checkbox"/> Y-Axis is correctly labeled with units <input type="checkbox"/> The legend appears on the graph
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Peer Reviewer Overall Score: 3.0 /4.0

Comments for peer:

The title is the same for graph 1, you need to rename it.

Part 3 - Regression Equations, Analysis, and Conclusions

Regression Equations Scatter Plot #2: Percentages of Food Waste in the Waste Stream from 1960-2012.

- Make 3 copies of your scatter plot on the SAME spreadsheet.
- Add a trendline of each type on the scatter plots and complete the table below. If you need help adding a trendline, follow the directions [here](#).

Trendline Type	Equation	R ² Value	Describe correlation
Linear	$0.0566x+10.7$	0.3	Positive Correlation
Quadratic (Polynomial)	$13.2+-0.269x+5.85E-3x^2$	0.845	Strong Correlation
Exponential	$11.1e^{4.08E-3x}$ ($11.1e^{408E-3x}$)	0.313	Positive Correlation

Analysis and Conclusions Scatter Plot #2:

Correlation: What type of correlation does your scatter plot appear to have (strong/weak, positive/negative, no correlation)? What does this correlation tell you about your topic? *For example, The strong positive correlation shown in the graph indicates that obesity was rising from 2002-2012.*

The strong positive correlation shown in the graph indicates the total percentages of food waste being generated from 1960-2012.

Regression Equation: Based on the regression equations above, which of the regressions (*Linear, Quadratic, Exponential*) is the **best fit** for your data and how do you know? (*use the R² value to justify your answer*)

The regression that's the best fit for my data is quadratic because the line for both linear and exponential looks the same since the R2 value is either 0.3 or it has 0.3 inside the number/value. The line makes this seem like a strong correlation while the other two have it being a positive correlation since the line just increases (goes straight up). Linear would not be a good fit because it has a weak R2 value.

Comparing to current data:

According to the regression equation, what is the value of your data in 2009? How does this number compare to the ACTUAL data set value in the same year?

****If you do NOT have data for 2009, select a year that you do have data for.****

The actual value of my second data set in 2008 is 13.60%. The estimated value using the regression equation is 13.8%. This makes sense because since it is a strong correlation we would expect the numbers to be close. The actual value of my first data set is 34,300 and the estimated value using the regression

equation is 34,074. This makes sense because the first number stayed as 34 and the only thing that changed was the numbers after the comma.

Predictions:

Using your regression equation, what is the value of your data in 2019? Is this prediction realistic? Why or why not?

The value of my data in the second set in 2019 is 17.6% and this prediction is realistic because from the last year which is 2012 on my graph you count up from 52 to get to 59. The value of my data in my first set in 2019 is 40,025 and this prediction is realistic because just like the second data set my last year was 2012 from there you count up from 52 to 59. The value during 2012 was 36,430.

Using your regression equation, what is the value of your data in 2025? Is this prediction realistic? Why or why not?

The value of my data in the second set in 2025 is 20.4% and I think this prediction is realistic because from the last year which is 2019 you count up from 59 to 65. The value of my data in my first set in 2025 is 43,271 and this prediction is realistic because just like the second data my last year was 2019 from there you would count up from 59 to 65 so it starts off at 40,025 and then increases to 43,271.

Analysis: What do your predictions mean for the future of your data? Based on the correlation coefficient, are your predictions reliable?

The predictions mean that in the future of my data the correlation will continue to increase and not decrease so it will stay as a positive or strong coefficient. My predictions seem to be reliable using the quadratic equation.

Part 4 - Caption Writing

Caption Draft - Scatter Plot #2

Many of these pieces you have already written in the various parts of your project. Write each piece separately before putting them together into a full caption.

Title: Write your draft *title* portion.

The title includes both the dependent variable and the span of years.

Percentages of Food Waste generated in the Municipal Waste Stream from 1960-2012

Trends: Write at least two sentences describing the *trends* you see in your scatter plot.

Data Analysis Word Bank:

Increasing, decreasing, however, trend/trending, not/moderately/highly correlated remains constant, until

Two trends that are noticed on the first data set scatter plot is that during the points on the x-axis between the years 1960-1990 there's a decrease then it begins to increase in the year of 2000 The three points at the end of the line remain constant/stay steadily the same.

Comparison Point: Write one sentence that describes the *last data point you know*.

The last data point that I know is in 2012 and this stays at the value of 14.5% just like the data point in 2011 which comes right before it.

Prediction: Write a sentence with your *prediction* based on the regression equation you used above. You can use either of your predicted values from Part 3.

"Based on the regression equation..."

"If trends continue according to the regression equation..."

Based on the regression equation, the value of my data in my first set on 2019 is 17.6% and this prediction is realistic because just like the second data set my last year was 2012 and from there you would count up from 52 to 59. While the value during the year 2012 was 14.5.

Analysis of Prediction Quality: Write at least two sentences evaluating the *reliability* of your prediction and justifying your evaluation.

Use a transition word.

Reference the R^2 value and describe what it means.

Furthermore, The predictions mean that in the future of my data the correlation will continue to increase and not decrease so it will stay as a positive or strong coefficient. The predictions that were made seem to be reliable using the quadratic equation $(13.2+0.269x+5.85E-3x^2)$ which has an R2 value of 0.845.

Implications: Write at least two sentences describing what the data suggest about your prediction.

“If...then....”

“This means that....”

If this data shows that the correlation will continue to increase and not decrease then the line will stay as a positive or strong coefficient. This means that the predictions I make could affect the future of my data.

Peer Review - Caption #1

Does the caption contain all of the necessary parts? If not, what parts are missing or incomplete?	The captions are nice
What are some of the stars (strengths) of the caption? What is well done?	Trends and Implications are very well done.
What are some of the stairs (areas of improvement) of the caption? What should your peer work on?	Just read over it.

Caption Final - Scatter Plot #2

Copy and paste the final, revised parts of your caption into one paragraph below.

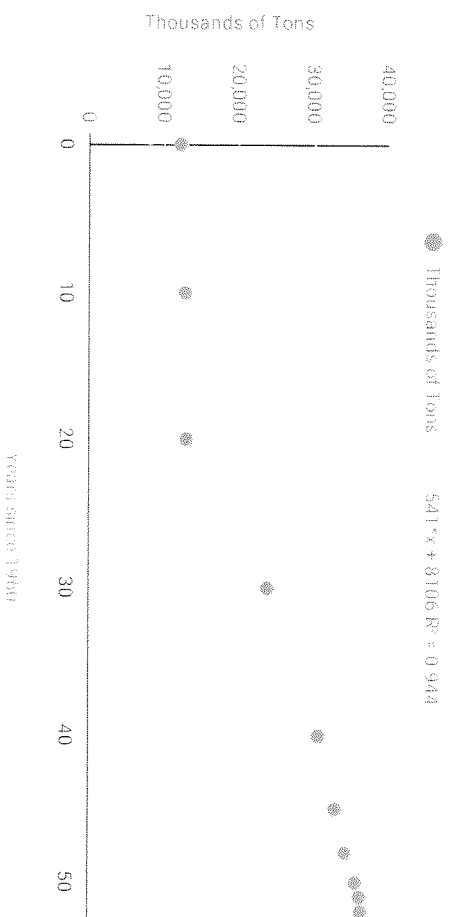
Percentages of Food Waste generated in the Municipal Waste Stream from 1960-2012. The figure shows that during the points on the x-axis between the years 1960-1990 there's a decrease happening then it begins to increase in the year of 2000. The three points at the end of the line remain constant/steadily the same. The last data point that you can see is in 2012 and it seems like this stays at the value of 14.5% just like the data point in 2011 which comes right before it. Based on the regression equation, the value of the data in this first set in the year of 2019 is 17.5% and this prediction is realistic because just like the second data set the last year was in 2012 and from there you would count up from 52 to 59. Furthermore, The predictions mean that in the future of the data, this correlation will continue to increase and not decrease so it will stay as a positive or strong coefficient as in the linear R2 value which is 0.944. The predictions that were made seem to be reliable using the quadratic equation $(13.2+0.269x+5.85E-3x^2)$ which has an R2 value of 0.845. If this data shows that the correlation will continue to increase and not decrease then the line will stay as a positive or strong coefficient. This means that the predictions that are made could affect the future of the data.

Year	Years since 1960	Thousands of Tons
1960	0	12,200
1970	10	12,800
1980	20	13,000
1990	30	23,860
2000	40	30,700
2005	45	32,930
2008	48	34,300
2010	50	35,740
2011	51	36,310
2012	52	36,430

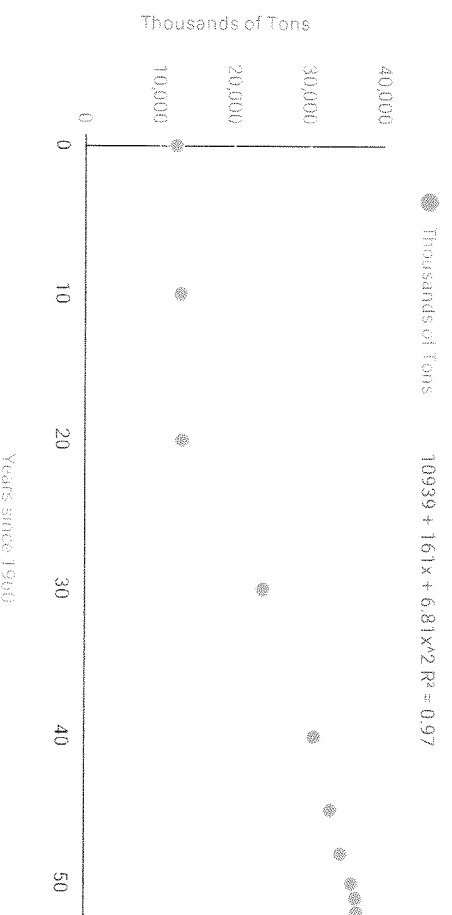
Source:

https://www.epa.gov/sites/production/files/2015-09/documents/2012_msw_dat_tbls.pdf

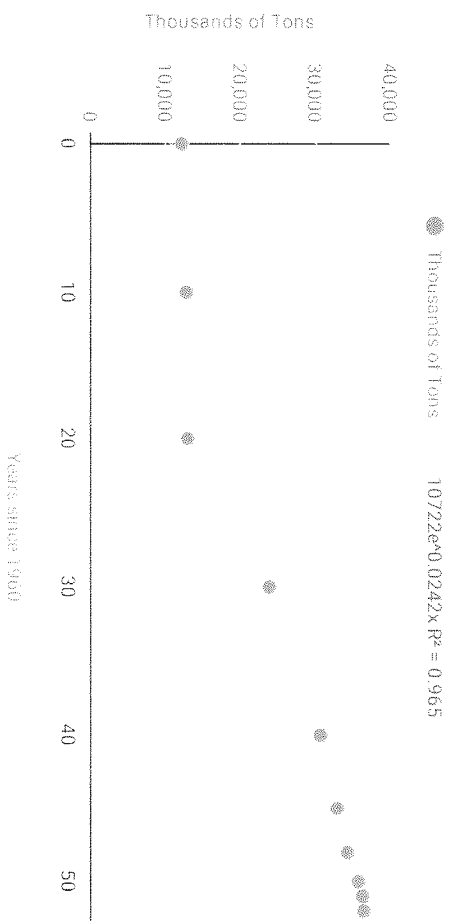
Food Waste generated in the Municipal Waste Stream between the years 1960 to 2012



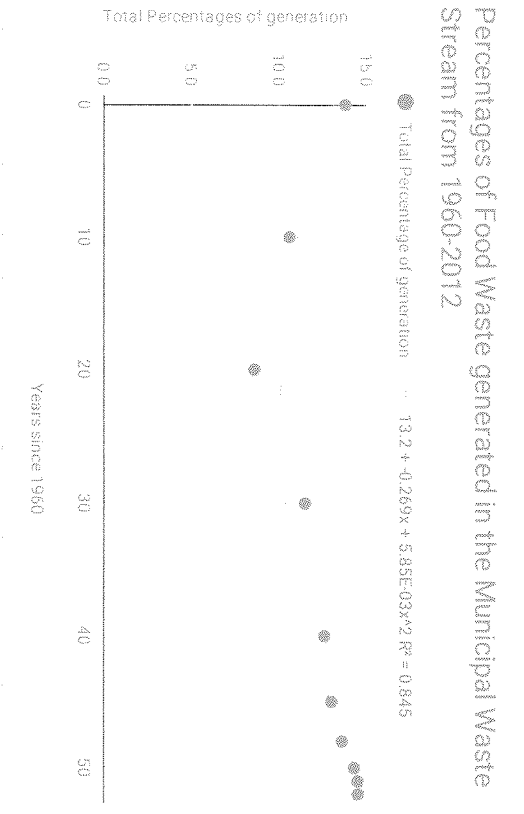
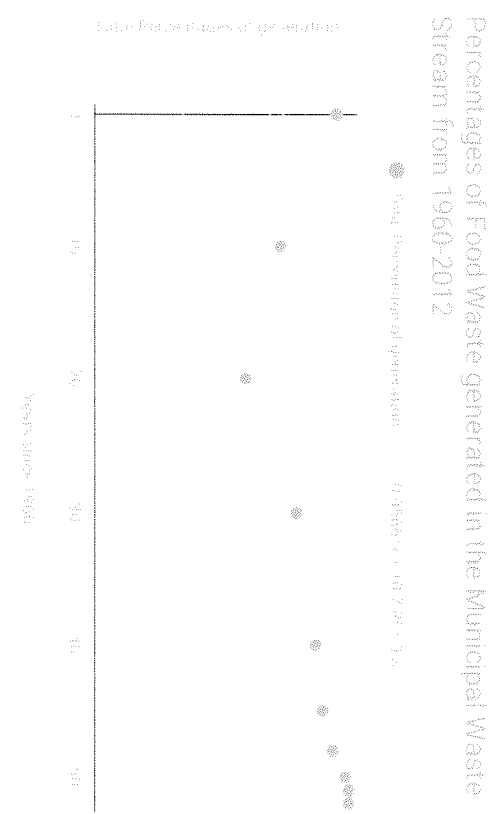
Food Waste generated in the Municipal Waste Stream between the years 1960 to 2012



Food Waste generated in the Municipal Waste Stream between the years 1960 to 2012

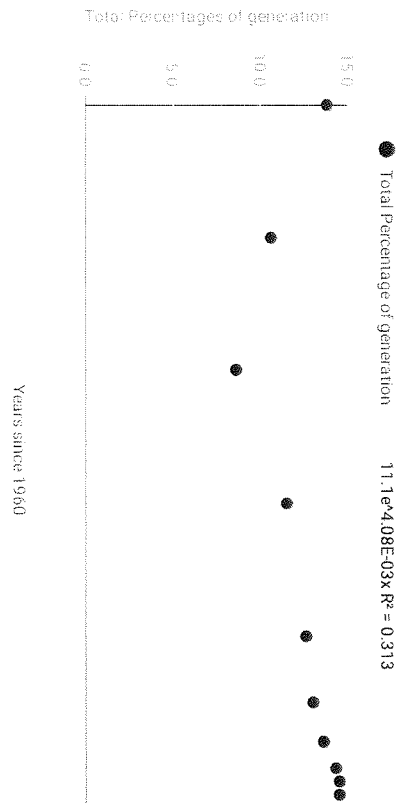


Year	Years since 1960	Total Percentage of generation
1960	0	13.8
1970	10	10.6
1980	20	8.6
1990	30	11.5
2000	40	12.6
2005	45	13.0
2008	48	13.6
2010	50	14.3
2011	51	14.5
2012	52	14.5



Percentages of Food Waste generated in the Municipal Waste Stream from 1960-2012

CONSUMPTION 1960-2014



Year	Years since 2000	Total Pesticides (tonnes)
2000	0	430005.21
2001	1	411407.94
2002	2	416851.04
2003	3	417758.24
2004	4	425015.71
2005	5	388275.15
2006	6	392810.67
2007	7	400068.14
2008	8	379202.92
2009	9	358337.7
2010	10	374818.2
2011	11	391298.7
2012	12	407779.2
2013	13	407779.2
2014	14	407779.2
2015	15	407779.2
2016	16	407779.2

< - Rename these!

Source: <http://www.fao.org/faostat/en/#data/RP>

