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"Feasibility of Agrifund under Sectoral Funds in India: A Study"

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Abstract:
M*utual Fund Investments are subject to market risks. Please read the offer……. People started leaving their myopic view towards Mutual Funds.Agriculture country like India, is into markets like commodity why not in mutual funds. This is the inception of AgFund. My study aims on whether the AgFund isviable to be an addition to Sectoral Funds or not.I have taken two variables for the study, BSE500 [SI] as independent variable and HCI [CI] as dependent variable. CI consists of 31 Agricultural Companies, i.e. Fertilizers, Machinery, Irrigation, and Seed.The results of Johanse's cointegration test provided evidence that there is a cointegration between BSE500[SI] and HCI[CI] which led to further study. Also, Results provided that HCI influences BSE[SI]. Thus, Econometrics provide evidence to AgFund can be addition to the Sectoral Funds and might attract investors and Portfolio Managers to flash a light with a light year speed.*

Keywords: AgFund (Agricultural Fund), Hemanth Customised Index (HCI), Standard Index (SI)

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I. Introduction

Agriculture has played a major role in development of human civilisation. Being second largest populous country in the world (WHO&MOSPI). Approximately 17.3% is contributed to India GDP. Ample number of schemes and programmes introduced by Indian government under different departments:

Agricultural Marketing	General Coordination	Plant Protection
Agriculture Census	Horticulture	Policy
Budget	Information Technology	Rainfed Farming System
Cooperation	Integrated Nutrient Management	Rashtriya Krishi Vikas Yojana
Credit	International Cooperation	Seeds
Crops & NFSM	Mechanization and Technology	Trade
Drought Management	Natural Resource Management	Vigilance
Economic Administration	Official Language	
Extension	Oilseeds Divisions	
General Administration	Plan Coordination	

Mutual Fund industry in India started in 1963 with formation of UTI in 1963 by an Act of Parliament and functioned under the Regulatory and administrative control of the Reserve Bank of India. In February 2003 UTI was bifurcated into two separate entities the Specified Undertaking of Unit Trust of India (SUUTI) and UTI Mutual Funds which functions under the SEBI MF Regulations. And now Asset under management (AUM) **15 lakh crore in July 2016 (AMFI).**

Types of Mutual Funds in India

Graph no. 1

Graph no. 2

Graph no. 3

Graph no. 4

Graph no. 5

Graph no. 6

II. Literature Review

Researchers have done research in various areas like Risk taking by Mutual Funds as response to Incentives by Judith Chevalier and Glenn Ellison (1997). Can mutual fund outguess the market by Jack L. Treynor and Kay K. Mazuy (1966). The Determinants of the Flow of Funds of Managed Portfolios: Mutual Funds vs. Pension Funds by Diane Del Guercio and Paula A. Tkac (2002). The growth of mutual funds in India: A special reference to sectoral mutual funds by Dr. Ashok Kumar and Suman Rani (2018). World Agricultural Fund by DSP Mutual (2011).

Need for the study

As researchers did research on various topic but not on inclusion of a new fund specifically AgriFund. And DSP Fund already started similar kind on Fund in the World Context (World Agricultural Fund). My study concentrates on Indian context of including a new fund under thematic funds, sectoral funds.

III. Objectives

The study focuses to examine cointegration between SI and HCI and influence the SI.

The following are the hypotheses:

H_0:BSE500 [SI] has a Unit Root

H_1: HCI has a Unit Root

H_2: There is no co-integration between BSE500 [SI] and HCI [CI**]**

H_3:HCI does not Granger-cause BSE500[SI]

H_4:BSE500 does not Granger Cause HCI

IV. Research Methodology

The study is quantitative in nature, it uses various statistical tools to analyse the relationship between BSE index and HCI. For the purpose of study, secondary data has been collected.Population consists of 31 agriculture companies [Fertilizers, Seed, Irrigation and Machinery] which are listed on Bombay Stock [BSE] are:

1. Aimco Pesticide
2. Bayer CropScience Ltd
3. Bhagiradh Chem
4. Bharat Rasayan
5. Camson Bio Tech
6. Chambal Fertilisers & Chemicals
7. Coromandel
8. Deepak Fertilisers & Petrochemicals Corporation
9. DhanukaAgritec
10. Escorts
11. Excel Crop Care
12. Finolex industries
13. Gujarat Narmada Valley Fertilizers & Chemicals

14. HMT Limited
15. Insecticides
16. Jain irrigation
17. Kaveri Seed Company
18. Kilpest (I)
19. Kirloskar brothers
20. Mangalore Chemicals & Fertilizers
21. MeghmaniOrgani
22. Monsanto India
23. Nacl Industries
24. Nagarjuna Fertilizers and Chemicals
25. National Fertilizers
26. PI Industries
27. Rallis India
28. Rashtriya Chemicals & Fertilizers
29. Sharda Crop
30. Super Crop Safe
31. ZuariAgro Chemicals Ltd

In first step, collected the historical prices of all 31 Agricultural Companies data for a period of 10 years i.e. from January 2009 to December 2018. Then applied Descriptive Statistics for 1y, 3y, 5y, 7y and 10y respectively. Descriptive Statistics includes:

- **Average Daily Return**

It is sum of total Returns by no. of daily returns.

- **Annualised Return**
- It is the geometric average amount of money earned by a stock each year over given period.
- **Variance**

It is the expectation of squared deviation of random variable from its mean.

- **Standard Deviation**

The dispersion of a dataset relative to its mean.

- **Skewness**

Distortion or asymmetry in a symmetrical bell curve or normal distribution in a set of data.

- **Kurtosis**

It is a statistical measure to describe the distribution.

- **Number of trading days**

Any day on which the primary market on which such shares of common stocks are listed is open for trading.

- **Annualised Standard Deviation**

It is the standard deviation multiplied by the square root of the number of trading days in one year.

The second step includes, to understand selection of appropriate Standard Index studied various indices from NSE, so to choose from BSE. And also understood what are customised Indices.

Standard Indices	**Customised Indices**
Broad market Indices	**Sectoral Indices**
Nifty 50 Index	Nifty Auto Index
Nifty Next 50 Index	Nifty Bank Index
Nifty 100 Index	Nifty Financial Services Index
Nifty 200 Index	Nifty FMCG Index
Nifty 500 Index	Nifty IT
Nifty Midcap150 Index	Nifty Media Index
Nifty Midcap 50 Index	Nifty Metal Index
Nifty Midcap 100 Index	Nifty Pharma Index
Nifty Smallcap 250 Index	Nifty Private Bank Index
Nifty Smallcap 50 Index	Nifty PSU Bank Index

Nifty Smallcap 100 Index	Nifty Realty Index
NIFTY LargeMidcap 250 Index	Nifty 500 Industry Indices Index
Nifty MidSmallcap 400 Index	
India Vix Index	
	Thematic Indices
	NIFTY100 ESG Index
	NIFTY100 Enhanced ESG Index
	NIFTY SME EMERGE Index
	Nifty Commodities Index
	Nifty CPSE Index
	Nifty Corporate Group Indices
	Nifty Energy Index
	Nifty India Consumption Index
	Nifty Infrastructure Index
	Nifty MNC Index
	Nifty PSE Index
	Nifty Services Sector Index
	Nifty100 Liquid 15 Index
	Nifty Midcap Liquid 15 Index
	Nifty Shariah 25 Index
	Nifty50 Shariah
	Nifty500 Shariah Index

Third step includes construction of **"Hemanth Customised Index"** [HCI] the following are steps of construction of HCI:
Step 1: Collected 31 Companies closing prices and Outstanding Shares as on 31st December 2018 as a Base.
Step 2: Then calculated the Weights for each company by:

$$\frac{\textbf{Price*Outstanding Shares}}{\textbf{Total Capitalization}} \textbf{*100}$$

Step 3: Then multiplied each company's weight with its closing price each month for 3 years.
Step 4: Finally arrived at HCI for 31 companies each month for 3 years by:

$$\frac{\textbf{Average of 31companies each month}}{\textbf{100}}$$

Fourth Step includes, selection of the standard Index [SI] BSE500 because commonality among Stocks. Collected the closing prices of BSE500 [SI] monthly for 3 years from January 2014 to 2018. Then divided with divisor 100 each month for 3 years.
To test the,

Unit Root Test (ADF)
- This tests whether a time series variable is non-stationery and possesses a unit root.

Johansen Cointegration Test
- It analyses non-stationery time series, processes that variances and means that vary over time.

Vector Error Correction
- It is restricted VAR designed for use with no-stationery series that are known to be cointegrated.

Granger Causality

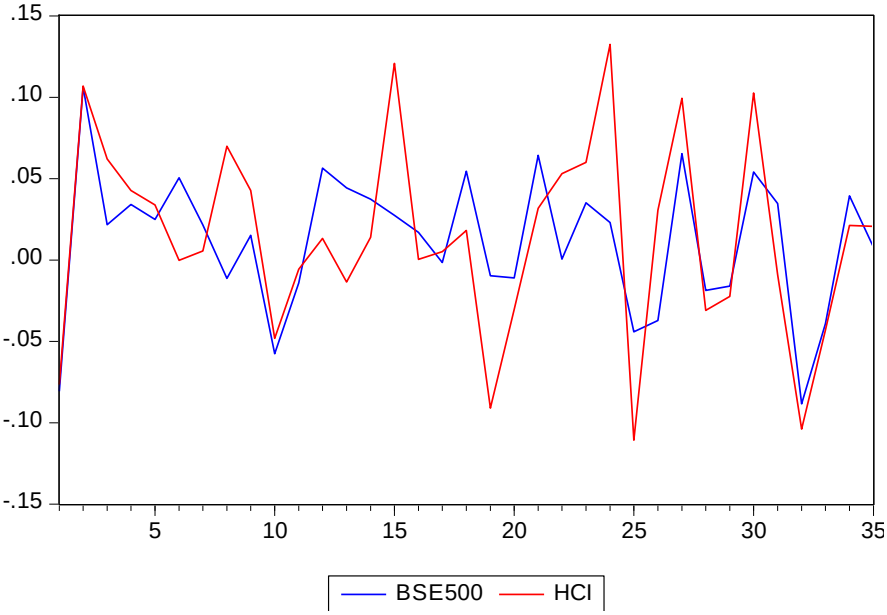
- It is statistical hypothesis test for determining whether one times series useful in forecasting another.

Tests conducted using Econometrics for analysis and results.

V. Data analysis and Results:

5.1 Relationship between BSE 500 and HCI

Graph no. 1: showing BSE500 [SI] and Hemanth Customised Index [CI]



Source: EViews 7 output extract

Interpretation:

The analysis starts with the Graph [1] of both the Indices, showing the trend and movements in prices. They both are looking symmetrical and moving together. HCI spikes more on BSE500 [SI].

5.2 DESCRIPTIVE STATTISCS

Table no. 1 showingDESCRIPTIVE STATISTICS

	BSE500	HCI
Mean	0.011603	0.014322
Median	0.021485	0.013971
Maximum	0.106354	0.132522
Minimum	-0.088369	-0.110757
Std. Dev.	0.042775	0.060483
Skewness	-0.404471	-0.106319
Kurtosis	3.008277	2.719044
Jarque-Bera	0.954412	0.181054
Probability	0.620515	0.913450
Sum	0.406100	0.501265
Sum Sq. Dev.	0.062209	0.124380

Source: EViews 7 output extract

Interpretation:

Next step is descriptive statistics of these variables, which shows mean, median, maximum and minimum values. There is a minimal deviation and the data is normally distributed. Skewness is negative in both the variable and their distribution is moderately skewed. Kurtosis in case of SI is mesokurtic and in case of HCI is platykurtic. In both the variables Jarque-Bera values are more than 0.05 which means normally distributed.And this gives to move for further analysis.

5.3 Unit root test for BSE 500 and HCI

Table no. 2 showing UNIT ROOT TEST [ADF]

Particulars	BSE500 [SI]				Hemanth Customised Index [CI]			
	t-statistic	Critical Value		P-value	t-statistic	Critical Value		P-value
At level	-5.23654	1% level	-3.64634	0.0001	-5.52451	1% level	-3.64634	0.0001
		5% level	-2.95402			5% level	-2.95402	
		10% level	-2.61582			10% level	-2.61582	
At 1st difference	-8.24527	1% level	-3.65373	0.000000	-8.6287	1% level	-3.65373	0.000000
		5% level	-2.95711			5% level	-2.95711	
		10% level	-2.61743			10% level	-2.61743	

Source: EViews 7 output extract

Interpretation:

For any time, series data, we need to make nonsense to meaningful data in other words non - stationery to stationery. We use Unit Root Test [ADF] for this. The above table no.2 show at level, p value close to Zero in both the variables but not Zero. Hence the Null hypothesis is rejected, both BSE and HCI has unit root. It can infer that levels non-stationery and stationery at 1st difference which shows the data is good for further tests.

Table no. 3 showing Johansen Cointegration Test

Date: 11/15/19 Time: 21:47
Sample (adjusted): 3 35
Included observations: 33 after adjustments
Trend assumption: Linear deterministic trend
Series: BSE500 HCI
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.590461	40.75473	15.49471	0.0000
At most 1 *	0.289843	11.29487	3.841466	0.0008

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.590461	29.45986	14.26460	0.0001
At most 1 *	0.289843	11.29487	3.841466	0.0008

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: EViews 7 output extract

Next, testing of relation between them. For this Johansen's cointegration test is used. The results of Johansen's Trace test and Maximum Eigenvalue tests as shown in the above table no. 3 indicates the existence of 2 cointegration equations between BSE500[SI] and the customised index [CI] at 5% significance level.

Table no. 4 showing Vector Error Correction Model

Vector Error Correction Estimates
Date: 11/15/19 Time: 21:51
Sample (adjusted): 4 35
Included observations: 32 after adjustments
Standard errors in ( )& t-statistics in [ ]

Cointegrating Eq:	CointEq1	
BSE500(-1)	1.000000	
HCI(-1)	-0.786194 (0.17985) [-4.37127]	
C	-0.000587	
Error Correction:	D(BSE500)	D(HCI)
CointEq1	-0.124415 (0.30366) [-0.40971]	1.462195 (0.50987) [2.86780]
D(BSE500(-1))	-0.297083 (0.29930) [-0.99259]	-1.044211 (0.50254) [-2.07786]
D(BSE500(-2))	-0.013477 (0.20642) [-0.06529]	-0.584569 (0.34658) [-1.68667]
D(HCI(-1))	0.015591 (0.19939) [0.07819]	0.227445 (0.33479) [0.67936]
D(HCI(-2))	-0.398872 (0.15047) [-2.65084]	-0.131251 (0.25265) [-0.51950]
C	-0.000582 (0.00641) [-0.09082]	-0.001972 (0.01077) [-0.18318]

Source: EViews 7 output extract

The coefficient of BSE500 is negative. And t-value is <1.96 in all cases.

VI. Conclusion

Table no. 5 showing Granger Causality Test

Pairwise Granger Causality Tests
Date: 11/12/19 Time: 09:53

Sample: 1 35
Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.	**Decision**
CI does not Granger Cause BSE500	33	6.40271	0.0051	Reject
BSE500 does not Granger Cause CI		0.23247	0.7941	**Accept**

Source: EViews 7 output extract

Granger Causality Test is last step to decide whether to reject the null hypothesis or failed to reject null hypothesis. The result above table no.5 show null hypothesis is rejected as p value is <.05 and Alternative hypothesis is accepted as it is >.05 and it is Uni-directional. **Hence, Customised Index of AgFund is viable to be a part of Portfolio among Mutual Fund.So,Inclusion of a New Fund i.e. AgFund under Sectoral Funds is Highly Recommended.**

Limitations of the Study

The study is innovative, creative and new but still it has some limitations. The Companies taken for the study are only 31 and other 2 Companies which are not a part of the study are budding i.e. listed in the stock market 2 years back. And very less companies are listed from the branches of Agriculture like Machinery, Seed and Irrigation. Further study can be made if the list of listed companies increases for more and precise results with the help of Hemanth Customised Index.

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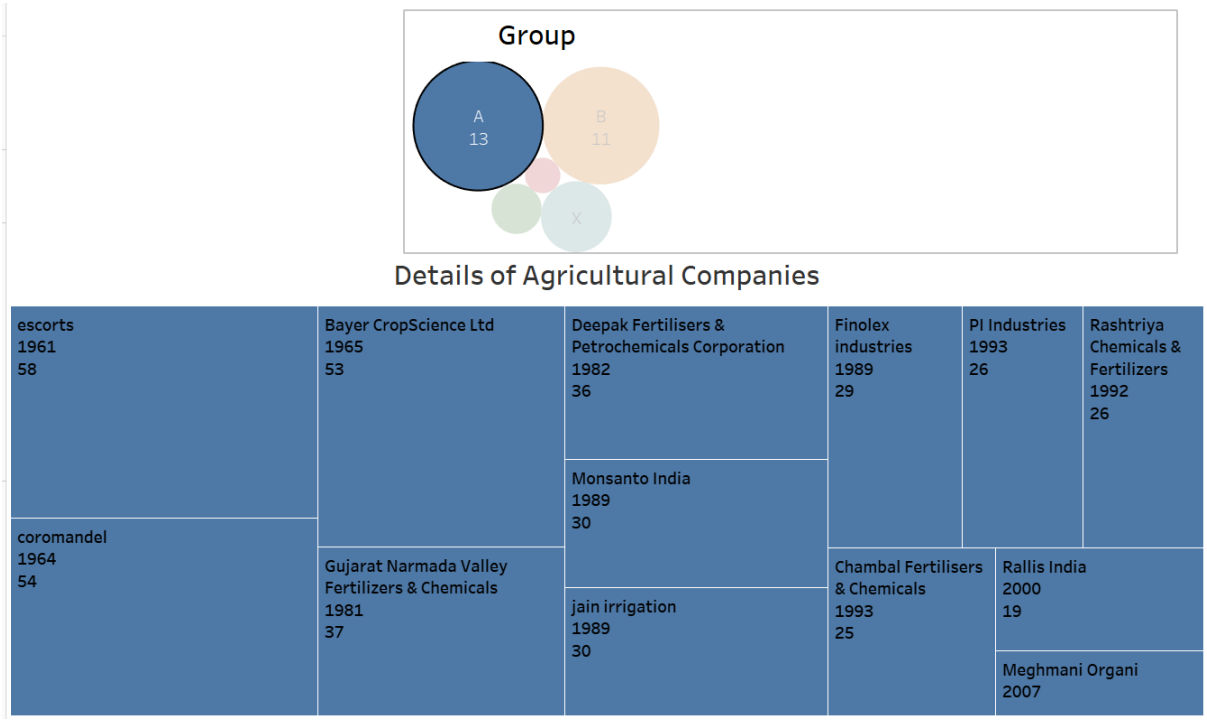
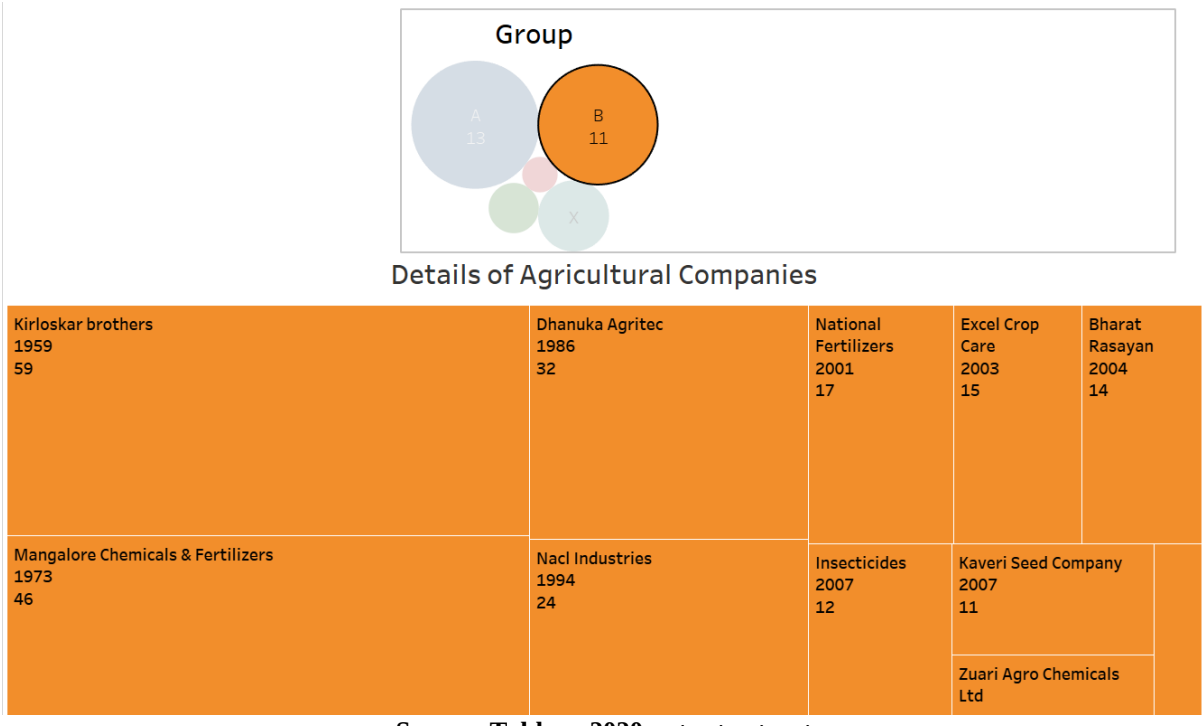
Appendix

The following graphs shows which the company belongs to, year of listing and age of the company.These graphs are built using Tableau:



Source: Tableau 2020 output extract



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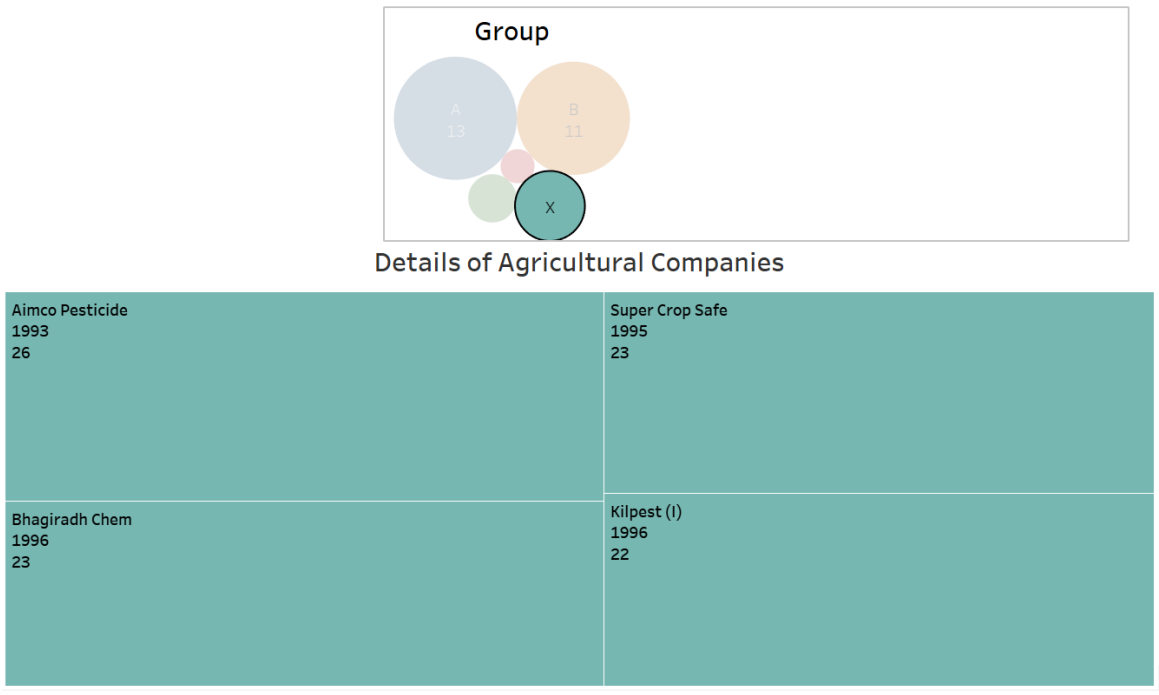

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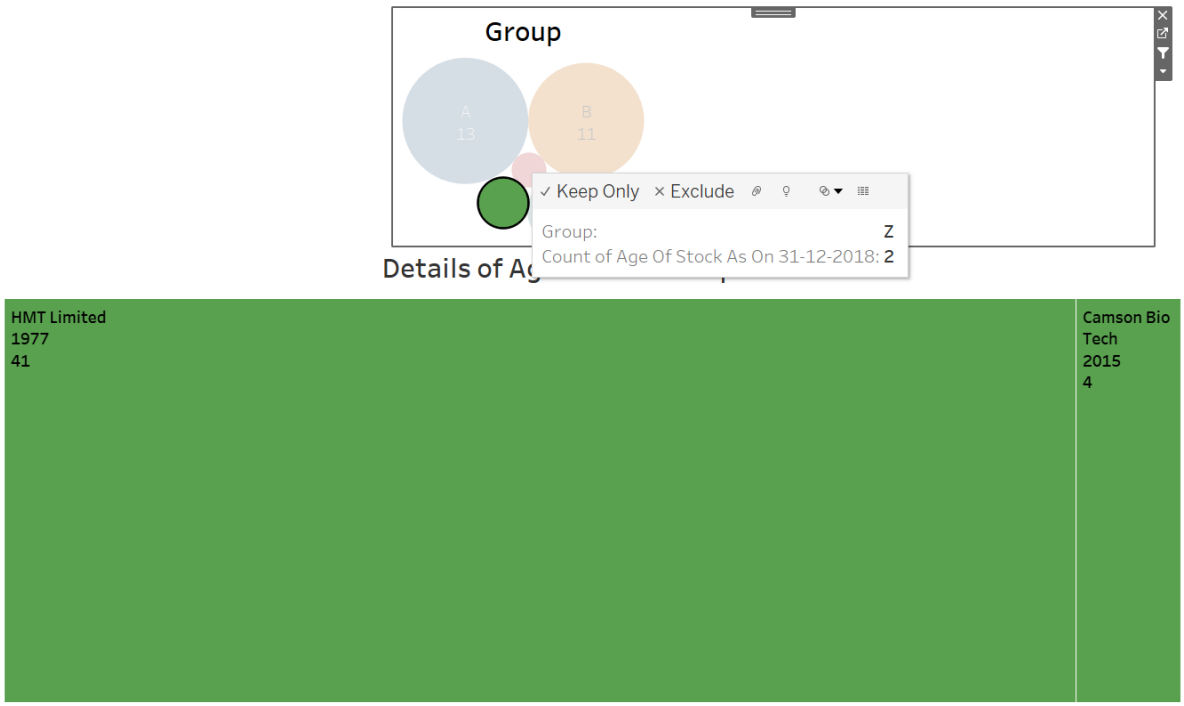

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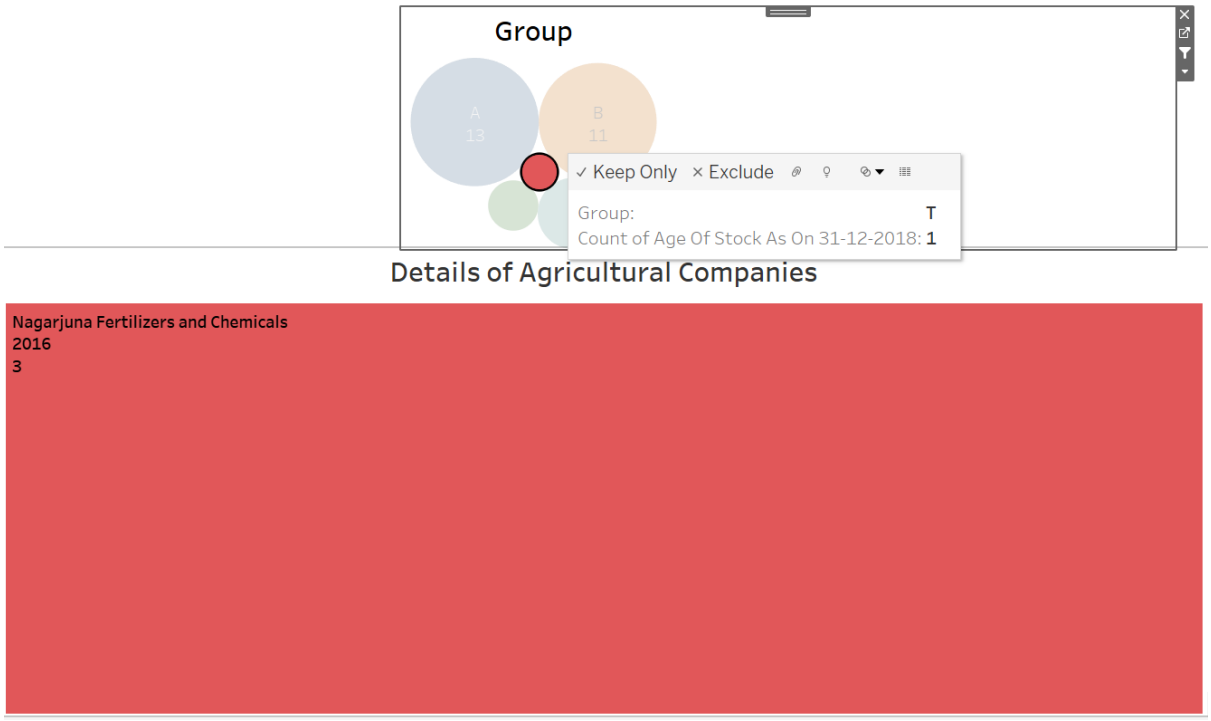

Source: Tableau 2020 output extract

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