

Understanding Demonetisation of Currency in India

The Case of the Agricultural Commodity Market

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A dissertation submitted for the partial fulfilment of
BS-MS dual degree in Science



Indian Institute of Science Education and Research, Mohali

November 2017

Certificate of Examination

This is to certify that the dissertation titled "Understanding Demonetisation of Currency in India: The Case of the Agricultural Commodity Market" submitted by Mr. Vinay Sudhakar Nikam (Reg. No. MS12132), for the partial fulfilment of BS-MS dual degree programme of the Institute, has been examined by the thesis committee duly appointed by the Institute. The committee finds the work done by the candidate satisfactory and recommends that the report be accepted.

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Declaration

The work presented in this dissertation has been carried out by me under the guidance of Dr. Ritajyoti Bandyopadhyay at the Indian Institute of Science Education and Research, Mohali.

This work has not been submitted in part or in full for a degree, a diploma, or a fellowship to any other university or institute. Whenever contributions of others are involved, every effort is made to indicate this clearly, with due acknowledgement of collaborative research and discussions. This thesis is a bonafide record of original work done by me and all sources listed within have been detailed in the bibliography.

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In my capacity as the supervisor of the candidate's project work, I certify that the above statements by the candidate are true to the best of my knowledge.

Dr. Ritajyoti Bandyopadhyay

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**To my parents
and my sisters, Shital Nikam
and Poonam Nikam for their endless love, support and
encouragement
and
To the hope for a time when the world will be free of
poverty and starvation.**

Acknowledgements

I would like to express my sincere gratitude to my thesis supervisor Dr. Ritajyoti Bandyopadhyay, who has helped me in every possible way throughout this journey of my thesis. The door to Dr. Ritajyoti Bandyopadhyay's office was always open whenever I ran into a trouble, or had a question about my research or writing. He not only supervised my thesis but went out of his way to accommodate and help in my other academic commitments. Your guidance has been so valuable for me. Thank you so much, Sir, for introducing me to a whole new kind of world that I was unaware of before. I cannot thank you enough for your tremendous support and help.

I am indebted to Dr. Abhishek Chaudhuri of IISER Mohali for his intellectual support, without which the analysis presented in this thesis would have remained grossly incomplete. Dr. Chaudhuri taught me some vital statistical methods to organise and interpret large-scale macro-economic data. Thank you, Sir, for your support.

I would also like to thank the experts who were involved in the examination and validation of my thesis, Dr. V. Rajesh and Dr. S. K. Arun Murthi. Without their inputs the thesis could not have been possible. I would like to thank Sarvesh Thakur (MS16146) for helping me with the python scripts. His help saved me weeks of work.

Thank you to my parents and both the sisters, Poonam and Shital, for their moral support and encouragement. I owe my success and achievements to them. Thank you to the IISER Mohali Mathematics department for teaching me some of the most valuable lessons of my life. I would also like to thank my friends Vishakha, Sumaiya, and Mugdha. My stay at IISER would not have been so much fun without them. A special thanks to Lata for always encouraging me and keeping me motivated. She has been a great support. A shout-out to Tejas and Tarun as well for keeping me sane during the difficult times. And last but not the least, a huge thank you to Kanishk and Neha. It was due to their support I managed to face the lows and bounce back. You guys are awesome. I am taking a lot from here and I hope that I will be able to do justice to the support and guidance provided by IISER Mohali.

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Abstract

The thesis attempts a critical analysis of the impact of the demonetisation of the Indian currency, specifically in the agricultural commodity market in India. Demonetisation has been one of the most debated topics over the last year. Although the move affected most of the population, its overall impact is still unclear, and at times, unanticipated. The thesis first presents a snapshot of the available infrastructure at the time of the demonetisation [8 November, 2016], and then proceeds to illustrate how it unfolded over the subsequent months. The thesis also includes a survey of the impact of demonetisation among the farmers in the town of Deola in Nashik, Maharashtra. The dissertation then conducts a macro-economic data analysis of the vegetable prices in various states of India, over the last three years. The observations from the survey and data analysis lead to some concrete results displaying the impact of demonetisation on the agricultural commodity market.

Chapter 1

Demonetisation

1.1 Introduction

The thesis attempts a critical analysis of the impact of the demonetisation of the Indian currency, specifically in the agricultural commodity market in India. We have tried to combine quantitative and qualitative data to study the dynamics of demonetisation in everyday life. As is argued here, this was essentially a politico-ideological decision which had unprecedented and unanticipated ramifications. As expected, demonetisation prompted hasty responses from the people of India, the media, the political elite as well as from the learned analysts of the Indian economy. The initial public response was highly polarised across the ideological spectrum. Here, we will make an attempt to arrive at an ‘academic’ understanding of this phenomenon--an understanding which, we believe, has become overdue. Of late, a need is felt to reorient the ongoing public debate on demonetisation beyond the uncritical paradigms of celebration and vilification. Over the months, we have closely followed the media coverage of the event, analysed the extant data concerning the agricultural commodity market, and we undertook an ethnographic field survey in Nashik, Maharashtra to arrive at an ‘on the ground’ understanding of demonetisation. Our objective is to give an initial account of the shockwave --a brief biography--of demonetisation in the months that followed event. Needless to say, this is a contemporary analysis with all its shortcomings. Therefore, this is a “rehearsal than a performance”.

Demonetisation is the act of stripping a currency-unit of its status as legal tender. The current form of money is pulled from circulation and retired, often replaced with new notes or coins.[\[1\]](#)

On November 8, 2016, Prime Minister Narendra Modi announced that Rs. 500 and Rs. 1000 notes would no longer be a legal tender. The notes, which constituted 86% of the total paper currency in circulation at the time, were being withdrawn over the next 50 days.

A lot of chaos followed demonetisation as almost everyone was affected by the storm it created. But out of all the sectors, the so called informal sector* bore the brunt of demonetisation. As my father is a farmer himself, I have had the exposition to the informal sector and more specifically, the agricultural sector. As there was not much literature and analysis available on the impact of demonetisation on this sector, I ventured to pursue the same. My background and the timing of the move made it easier for me to decide the topic of my MS thesis.

Informal Sector - It is a part of the economy which is not regulated and protected by the state. The small enterprises in this sector are usually owned by a family and provide more permanent employment compared to formal sector. These enterprises are engaged in the sale and production of goods and services operated on a proprietary or partnership basis.[2]*

The thesis is divided into three chapters. The first chapter is an introduction to demonetisation. It lists the reasons behind India's demonetisation and tries to verify the claims made by the government. The second chapter includes a description of the fieldwork involving farmers and merchants. It provides the ground level picture of what happened due to demonetisation across vegetable markets in different states. Chapter three, the final chapter of the thesis, contains all the macro-economic data analysis of the vegetable prices across the Indian states. It provides statistical results showing the impact of demonetisation on the vegetable prices followed by the conclusion.

It has been more than a year since India treaded the path of demonetisation, and the results are slowly coming in. Let us follow the arguments put forth in favour of and against demonetisation.

1.1.1 Demonetisation, A Success:

Shashikanta Das, the Joint Secretary in the Department of Economic Affairs, Ministry of Finance, believed that the money which was lying idle at home and now has come into the banking system would allow banks to give loans at a lower interest rate.[\[3\]](#)

Chief economic advisor to the Government of India Arvind Subramanian had stated that the blip in the real estate prices and sales might be good in the long run because bringing down the real estate prices was also one of the reasons of demonetisation.[\[4\]](#)

Former NITI Aayog chairman Arvind Panagariya said that the move was not an isolated one and it was a necessary step in the process to fight black money. He also stressed that the move has sent "strong signals" in various quarters.[\[5\]](#)

NITI Aayog member Bibek Debroy said that the economy had climbed back from the temporary shock of demonetisation. He also stated that demonetisation should not be seen through a narrow cost-benefit analysis but as a move aimed at what he called "institutional cleansing".[\[6\]](#)

1.1.2 Demonetisation, A Failure:

Amartya Sen had opposed the demonetisation and stated,"It is a gigantic mistake, both regarding its objective of dealing with corruption as well as the objective of one rapid jump of getting into a cashless economy."[\[7\]](#)

In his interview with THE WIRE, Economist and Professor at JNU, Prabhat Patnaik said that the demonetisation broke the informal economy and has had no positive effect. He also went on to say that it has dealt a blow to the informal economy which is much greater than is measurable by looking at just GDP growth rate. Unlike many other economists, Prabhat Patnaik had given a detailed analysis about the failure of demonetisation on several occasions. I have included his comments throughout the chapter.

The senior journalist P Sainath also shared similar opinion. He questioned the rationality of the policy and pointed out that the government has failed to realise the impact of the move on rural India.[\[8\]](#)

The former chief economist of the World Bank, Kaushik Basu had expected the GDP to fall below 6% but not as much as 5.7%. He said most of the rich people managed to redeem their money and the small traders, the informal sector and the poor have suffered the most. At the same time, he also pointed the good initiatives such as GST and the enactment of the new bankruptcy law.[\[9\]](#)

India's demonetisation drive will become a case study for economists for years and years to come, says Kenneth Rogoff, Professor-Economics, Harvard University.

Though Kenneth Rogoff has been a long time supporter of phasing out paper currency i.e. Demonetisation, he has also suggested few guidelines. He lists, in his 2016 book titled 'The Curse of Cash', that the process of phasing out the high-value currency notes should follow three guiding principles:

"First, the ultimate goal is to make it more difficult to engage in anonymous untraceable transactions repeatedly and on a large scale. Relatedly, it is intended to make it more difficult to secretly transport and store large quantities of cash. The idea is to reduce wholesale use of cash in tax evasion or illegal activities. For the most part, the use of cash in large legal transactions is becoming increasingly vestigial and unnecessary, at least in advanced economies.

Second, the speed of transition needs to be slow, stretching changes out over at least 10–15 years. Gradualism helps avoid excessive disruption and gives institutions and individuals time to adapt. It puts authorities in a position to make adjustments as issues arise and as new options become available. This is an important point; obviously, over any long course of transition, new technologies and new issues will arise, and any realistic plan has to acknowledge this possibility.

Third, it is essential that poor and unbanked individuals have access to free basic debit accounts (or the future equivalent), and possibly also basic smartphones, as several countries have already done or are contemplating. The cost is ideally borne directly by the government, though it can also be imposed on banks that will eventually pass the costs on to paying customers. Under the current system, financial exclusion imposes high costs on the poor (e.g., high fees for cashing checks or wiring money), and a strong case can be made for providing better access to financial services even under the current system. The costs are small compared to providing universal health care, and the potential benefits are large."[\[10\]](#)

This chapter observes the process of demonetisation of Rs. 500 and Rs. 1000 notes in India, its motive, implementation, results and how it was different from the guidelines suggested by Prof. Kenneth Rogoff.

1.2 Motive:

Following were the officially cited reasons for the move:

- (a) Curbing the black money
- (b) Preventing the counterfeit currency usage for terrorist funding
- (c) Push for digital and cashless India
- (d) Financial inclusion

Let's look at these reasons in detail:

(a) Black money

Corruption is one of the major problems faced by India, and physical cash has always made it easier. Fighting the corruption has been the prime objective of the current government and demonetisation was seen as an attempt to curtail the same. But when we see how much of the black money is actually present in physical form, the reality is not as we might have expected.

An article published in Economic and Political Weekly says, “Only a part of the black money is held as ‘black cash’. According to estimates in the National Institute of Public Finance and Policy (NIPFP) (1985), cash was a ‘very significant’ form of holding black money in only less than 7% of the cases. The prominent forms of holding black money were: (a) under-valued commercial and residential real estate; (b) under-valued stocks in business; (c) *benami* financial investment; (d) gold, silver, diamonds and other precious metals; and (e) undisclosed holdings of foreign assets.”[\[11\]](#)

The fact that 99% of the demonetised notes were returned to the banks is enough to conclude that people, who had illicit money, found ways to deposit it into the banks. Also, a big portion of cash might actually be legal or made legal through myriad ways. Prabhat Patnaik had also pointed out that there is no connection between the currency-GDP ratio and the magnitude of illegal activities. It is true that demonetisation affected the use of black money in the short term and induced the fear of authorities into those with unreported cash, but we'll have to wait longer to see its lasting effect on the economy.

(b) Counterfeit currency

Counterfeit notes have been cited as the reason for cross-border terrorism and regional unrest in parts of the country such as Jammu and Kashmir. But the RBI data indicates that the Fake Indian Currency Notes (FICN) constitute very small part of the total currency in circulation. The RBI report published in 2016 states the following:

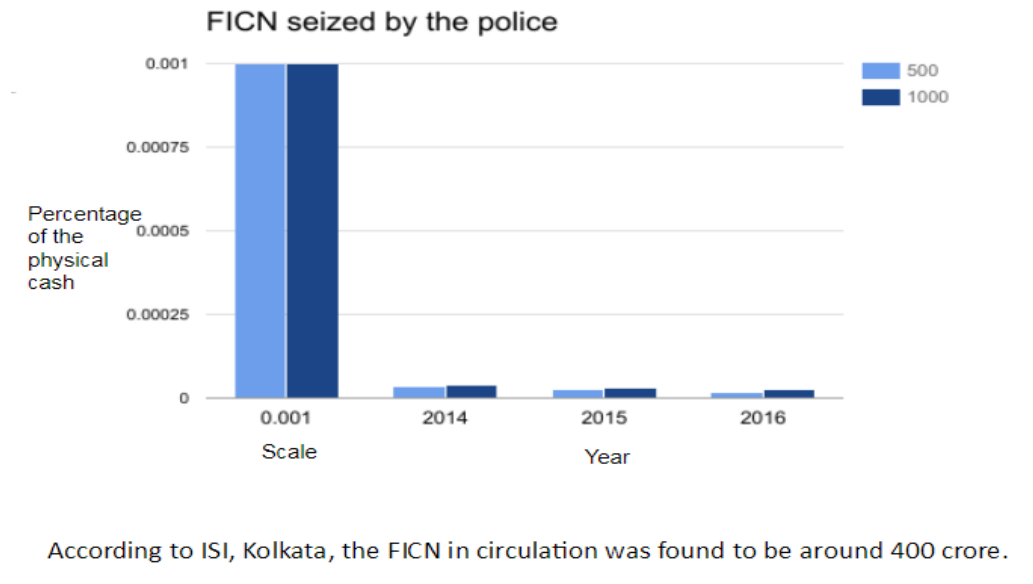
“The share of FICN seized by police in the total number of Rs.500 notes in circulation was 0.0037% in 2013, 0.0025% in 2014 and 0.0019% in 2015. The share of FICN seized

in the total number of Rs.1,000 notes in circulation was 0.0038% in 2013, 0.0031% in 2014 and 0.0028% in 2015.”

“The share of FICN in the total number of Rs. 1,000 notes in circulation was 0.000021% in 2013–14, 0.00002% in 2014–15 and 0.00002% in 2015–16 (RBI 2016).”[\[12\]](#)

Thus, it is unclear if the quantum of FICN is significant to warrant overarching measures like demonetisation.

On the other hand, J&K saw 60 % decrease in terrorism-related violence and 50% decrease in hawala operations after the demonetisation. So its effect has been positive in some areas.[\[13\]](#)



Source : epw.in

(c) Digital and Cashless India

The government has been encouraging the citizens to go digital through its various schemes. Linking the customer’s Aadhaar and PAN number to bank accounts are few of its many digital India initiatives**. But it is also important to see if we have the required infrastructure before implementing policies such as demonetisation. According to a 2015 report published on the website adamsmith.org, 47% of the Indian population did not have access to banks. Only 39% of bank account holders had an ATM or a debit card. Another report by TRAI says total internet subscribers per 100 population were 30.56 in India as on December, 2016.

**Digital India- It is a campaign launched by the Government of India to ensure that Government services are made available to citizens by improved online infrastructure and by increasing internet connectivity or by making the country digitally empowered in the field of technology.

This number has increased to 33.47 as on June 2017. It is clear from these facts that the internet and banking penetration in India is really low and it will take some more time for people to catch up with the technology.[14]

Though the demonetisation was an early call compared to country's preparedness, it has definitely given a push to the digital India initiative. Various payment apps and UPI based payment services witnessed an increase in the transactions after demonetisation.

Though the digital transactions have seen a slow dip since last six months; industry experts are optimistic that there will be a turnover in terms of economic growth over the coming years.[15]

(d) Financial inclusion

The government had launched Jan Dhan Yojana as a platform for financial inclusion. Demonetisation and recently implemented GST*** are seen as the moves to help the inclusion further. Prabhat Patnaik said that the GST was implemented in a hurry as well and has further crippled the economy. But the government has a different opinion regarding GST. The Finance Minister wrote in one of his blogs that tax base has increased by 25% since last year. Though many of the Jan Dhan accounts had zero balance until November, 2016, there was a sudden surge in the deposits over the next couple of months. According to the Finance Minister, today, only 20 percent of these accounts have zero balance, and soon these would be operational too as the direct benefit transfer is expanded.[16]

1.3 Implementation

While the Government seems to be following the first guideline suggested by Prof. Kenneth Rogoff, it did not follow much on the second and the third. With reforms like GST and mandatory Aadhar card linking to bank accounts coming into place, it is going to be more difficult to complete secret transactions on a large scale. This will definitely help in reducing the illicit trade activities.

As far as the transition was concerned, it was exactly the opposite of what was being suggested in 'The Curse of Cash'. The transition period should have been longer. A period of up to seven years could have been better. This has a couple of advantages. It gives authorities time to tackle the problems as they arise without too much rush and it does not create panic among the cash holders. The later was seen at large last year. The 50-day window was definitely too small. It also puts unnecessary stress on the banking system.

The access to banks for poor people and digital penetration was also not up to the mark as has been explained earlier. The government could have pushed for the infrastructure before implementing this policy.

***Goods and Services Tax (GST)-GST is an indirect tax which was introduced in India on 1 July 2017 and was applicable throughout India which replaced multiple cascading taxes levied by the central and state governments.

1.4 Conclusion

Considering the fact that the demonetised notes constituted 86% of the cash, the difficulties everyone had to face were not surprising. The GDP fell to 5.7% in the first quarter of 2017-18.[\[17\]](#) While many in the formal sector faced problems exchanging the notes and sacrificed their valuable work hours, people employed in the informal sector were hit the hardest. As the informal sector is heavily cash dependent, the problems only got bigger. Even a year after demonetisation, some elements of the economy are still recovering.

Many small and medium businesses had to shut down due to lack of cash. Handloom industry was adversely hit. [\[18\]](#) Thousands of labourers lost their jobs. More than 100 lives were lost in the process. [\[19\]](#) After so much sacrifice we are forced to think, was it worth it?

While many of the people who supported the decision last year might not share the same view today, there is also a bunch of people who are optimistic about the results. While the opposition termed Nov. 8 as 'Black day', the NDA government was busy projecting the benefits of the move implemented on 'anti-black money day'. Many economists, including the former RBI Governor Raghuram Rajan, think that we still need time to completely weigh the outcomes of demonetisation. After one year, we can see some of the objectives demonetisation has failed to achieve, but only coming years will tell whether it has achieved its long-term goals. With my limited knowledge of the field and the mixed results that we have after a year, I would not term the decision as completely right or wrong as of yet. It is true that demonetisation reduced the share of cash in the economy. It also helped India move towards the more formal economy and also expanded its tax base. But was a big policy such as demonetisation necessary to achieve these goals? Only time will tell.

Though both, Prof. Kenneth Rogoff and Prabhat Patnaik have not supported the way demonetisation was implemented, there is a major difference in their arguments. Prof. Rogoff has been a supporter of demonetisation for a long time, whereas Prabhat Patnaik has been a critic since the beginning.[\[20\]](#) In the next chapters, I have tried to weigh their arguments using the ground level results and arrive at a conclusion.

Chapter 2

Effect of Demonetisation on farmers and its analysis using micro-economic data

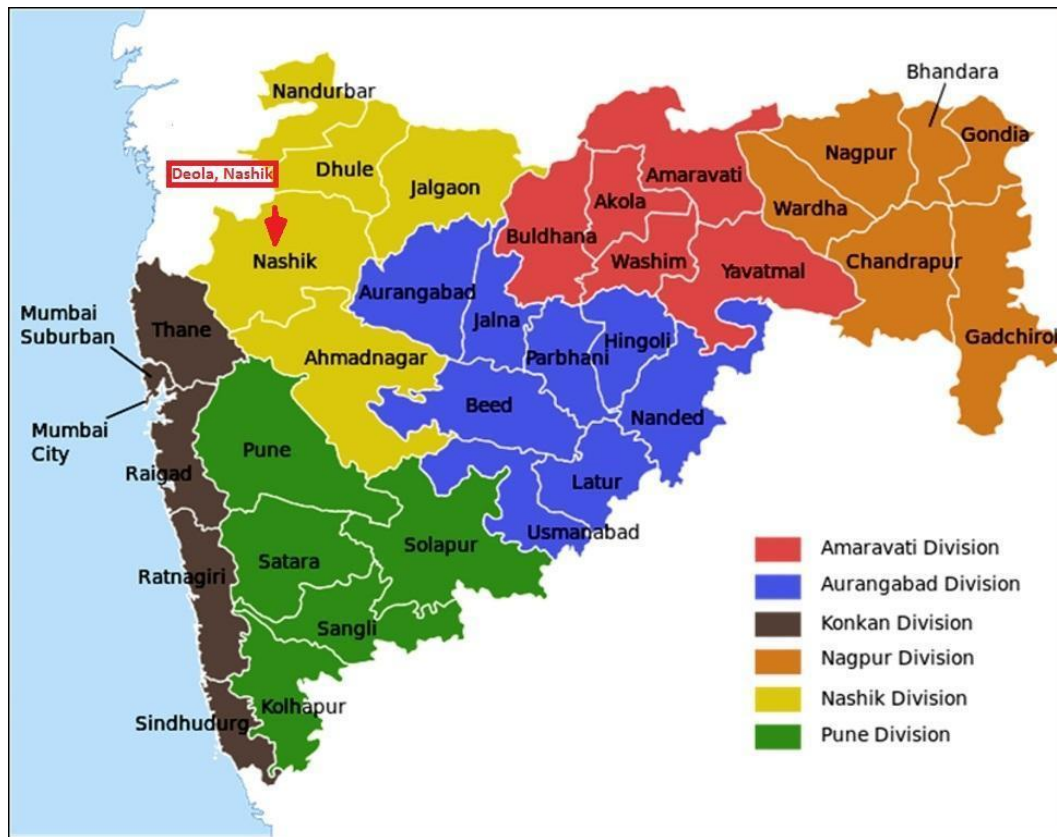
2.1 Introduction

The agricultural sector is one of the important parts of Indian informal economy and farmers constitute a substantial amount of its labour force. The agricultural sector is highly cash dependent and hence, it was majorly affected due to demonetisation. In this dissertation, I attempt to make a case study of the vegetable prices and compare the micro-economic data with the available macro-economic data to study the effect of Demonetisation on farmers and vegetable prices. To study the ground reality, I visited a local vegetable market and interviewed farmers over a period of two months during the summer of 2016. It should be noted that the survey was conducted before the implementation of GST and hence it provides a unique and an uncontaminated view of the impact of demonetisation on the agricultural sector. The economy was further affected post GST and it would be impossible to have an untampered data analysis of the economy as both demonetisation and GST will play a role in it.

My focus during the survey was mainly on the people whose primary source of income is farming. This chapter is about the observations and conclusions based on my fieldwork.

Location of the Survey: Deola, District - Nashik, Maharashtra

I conducted the survey in Deola. It is a Taluka located in Nashik district of Maharashtra. It has a local vegetable market where 100-200 farmers from nearby villages as well as surrounding towns gather to sell their produce to the merchants. The sell takes place via auction at 7 PM on all days except Sunday. Deola also has a separate Onion market. But the primary focus of the survey was perishable vegetables such as Tomato, Brinjal, Cabbage, etc. and not Onion, since it can be stored for a longer duration, unlike other vegetables.



2.2 Methodology followed during the Survey:

I visited the market in the evenings around 6 PM over a period of two months. For the first few days, I just observed how the whole process worked. Later on, I started talking to farmers and the people involved in the auction process regarding their experience of Demonetisation. I tried to gather as much information as I could regarding various challenges faced by the farmers. A questionnaire was used while interviewing the farmers. It's been explained in detail later in the chapter.

Objective of the Survey:

The main motive of the survey was to know the various challenges farmers faced due to demonetisation and also how they responded to the same.

The questionnaire mainly involved the following points:

- (1) How much time did the market take to recover from the initial shock?
- (2) What were the problems faced by the farmers?
- (3) What market activities were affected due to Demonetisation?
- (4) What did the farmers feel about Government's decision to ban the high-value notes?

2.3 Observations and discussions:

While interviewing the farmers, I observed that the problems faced by all of them were more or less similar depending upon their economic condition. I have presented their responses to the most common issues below, in a collective manner.

(1) What crops do the farmers grow?

- The farmers I interviewed grow a variety of crops including vegetables and grains. Most of them grow fruits and vegetables such as Tomato, Cabbage, Onion, and Chilli and grains such as Bajra and Corn.

(2) Do they have a bank account in a nationalised bank?

- While not everyone of them had a bank account in a nationalized bank, almost everyone had a bank account in a local or a co-operative bank. When I enquired further about their preference regarding nationalised and local banks, they stated that they would prefer local banks over nationalised ones. Getting a loan from the bank is the most important thing for them and it is a cumbersome task to get a loan from the nationalised bank because it involves a lot of paperwork and the farmers often have to visit the bank too many times to get it authorised. It takes a month on an average to complete the process. On the contrary, not so much of the paperwork is needed in local or co-operative banks. Farmers can get the loan in as early as 3 days. Also, being a local bank, most of the farmers and bank employees know each other personally. This helps them in a couple of ways. It makes the process quicker and at times, the employees help the farmers complete the paperwork. The later one becomes really helpful if the farmer is illiterate and finds the paperwork difficult. The employees in the nationalised banks cannot pay such personal attention to everyone as they are already overburdened with too many customers. There will always be a long queue in the nationalised banks all the time.

(3) What problems did they face during demonetisation?

- Apart from the currency exchange problems, the farmers faced considerable hardship to pay wages to the labourers. During demonetisation, farmers did not have a large sum of money. So, they either had to borrow from someone else or pay the amount in instalments so that they could hold on to the cash for longer.

The laborers did not have bank accounts and were also reluctant to accept the new notes. They would accept only Rs.100 notes. This resulted in them getting paid less for a couple of months until the situation got back to normal.

(4) How did they manage the daily expenses?

- Even though the farmers did not have much cash, they still needed to buy the pesticides. As the shopkeepers and farmers knew each other, they could borrow the pesticides on credit and pay within a month or two. A similar understanding was there regarding the grocery too.

(5) How long did it take to get the payment?

- It took the farmers anything between 8 days to 2 months to get the payment. Due to the cash crunch, the payments were being deposited into the accounts. So, even though farmers had money in their account they could not withdraw all of it and as the agricultural sector is mostly cash dependent, the overall activity had slowed down. A few of the farmers also reported that they were still expecting their payments after 7 months. While the amount was around Rs.5000 for one of them, another farmer said, a merchant owed him Rs. 35,000.

(6) How long it took for the market to recover?

- It took almost 5-6 months, i.e. until April-May, for the market to recover from the setback. While most of the payments were done through cash before demonetisation, the cheques were preferred for the payments since November 2016. As of July 2017, merchants and farmers were slowly going back to cash as a preferred mode.

(7) What is their opinion about the demonetisation decision?

- Each one of them said that they had to face a lot of hardships due to demonetisation but also mentioned that it was a good decision and PM Modi is doing a good thing. It was interesting to see that out of all of my interviewees, not a single person said that demonetisation was a wrong decision. When asked about the reason behind the same, they would enthusiastically say that this decision will punish the corrupt and it has affected the people with black money.

Additional points:

I also had the opportunity to talk to the merchants who were regular in the market. These were the people who generally bought the produce from the local market and sold it in the bigger markets such as Mumbai, Bhopal, Surat, etc. While interacting with them I came to know a few interesting things. When asked about their experience, they did not mention any big issue. Most of the farmers and merchants know each other, so there is trust among them. This allowed the trading process to continue on a smaller scale even without the cash. This was also the main reason why the industry did not collapse completely. The scenario would have been different if the primary transaction mode had been digital. Though demonetisation had affected the merchants as well, the effect, it turns out, was not as serious as it was on the farmers. Before November 8, the preferred mode of payment was cash. And usually, the dues were paid within a week. But after November 8, due to the lack of cash, the merchants were either borrowing the produce from farmers with a promise of payment within 3-4 weeks or simply asking the farmers not to send the yield to the market. Most of the payments took place through cheques. Encashing them was an additional problem for farmers. The merchants can also, in a way, minimise the loss or maximise the profit, unlike the farmers. They can sell the vegetables for the price greater than or equal to the cost price, depending on the demand. This also eased problems for them. Merchants managed to earn enough money, if not too much, for the basic requirements.

2.4 Conclusion

India's large dependency on cash is often cited as one of the reasons of why we could survive the 2008 financial crisis with little damage. But it has its own drawbacks too. Demonetisation hit the cash-dependent people the most, including the farmers. From my observations and the interviews, I would conclude that the situation was way beyond the normal in the markets during the demonetisation. But it is also true that farmers and all other people associated with the agricultural trade showed huge patience during this phase. As said earlier, this survey presents the impact of demonetisation on the agricultural sector before the GST was implemented and hence holds special value.

It is also important to note that this segment did not collapse only because people showed faith in each other, both morally and financially. They faced a lot of problems including labour payments, buying the pesticides and withdrawing the required money from the bank for the 2-3 months. Many still await the payments for crops sold during those two months. Many had their money stuck in co-operative banks for months because the co-operative banks were not allowed to exchange the notes. For many of them, it was one of their hardest phases. I could see the pain when they narrated various incidents to me. It was definitely not a joy to listen to their problems and stories, but it was really assuring to know that they have not given up on the system and still hope that the situation will change for better.

Chapter 3

Effect of Demonetisation on vegetable prices and comparing the macro economic data with the micro economic data

3.1 Introduction

Government of India maintains a database of the daily vegetable prices across different markets in India. For the macro economic data analysis, daily vegetable price data of the last 3.5 years (starting January 2014) was downloaded from <http://agriexchange.apeda.gov.in> website. It is a database maintained by the Agricultural & Processed Food Products Export Development Authority (Ministry of Commerce & Industry, Govt. of India).

The data was downloaded for the following crops: Brinjal, Cabbage, Cauliflower and Tomato. Production of these crops is maximum among the perishable vegetables.[\[21\]](#) India ranks second in the production of Brinjal, Cabbage and Cauliflower globally. These crops are selected because they are available in the market throughout the year and they are produced in most of the agricultural states.[\[22\]](#)

3.2 Methodology of the data analysis

A computer program was used to download the data automatically for each crop*.

The contents of the files are explained below.

The third and fifth row of the file indicates the corresponding date and crop respectively. Starting from the sixth row, the first column indicates the states and the corresponding markets for which the price data is available. The second and fifth column indicates the total quantity and variety of the crop in the market respectively. Sixth, seventh and eighth column indicates the minimum, the maximum, and the modal price respectively for which the crop was sold on that particular day. All the prices are in Rs./Quintal.

	A	B	C	D	E	F	G	H
1	India Price							
2								
3	Value in Rs/Quintal							
4	Date: 01/01/2017							
5	Source: Agmarknet							
6	Product: Onion							
7	Andhra Pradesh							
8	Market	Arrivals (Tonnes)	Origin	Grade	Variety	Minimum Price	Maximum Price	Modal Price
9	Alur	NR			Beelary-Red	600	800	700
10	Eluru(P.Sri.Mkt),RBZ	NR			Onion	1400	1400	1400
11	Eluru-II,RBZ	0.1			Onion	1400	1400	1400
12	Kurnool	NR			Local	100	520	320
13	Mydukur	NR			Local	200	400	300
14	Pattikonda	NR			Local	1500	1800	1600
15	Assam							
16	Market	Arrivals (Tonnes)	Origin	Grade	Variety	Minimum Price	Maximum Price	Modal Price
17	Bohorihat	2.5			Other	1400	1600	1500
18	Bongiagaon	41.5			Other	1400	1500	1450
19	Chandigarh							
20	Market	Arrivals (Tonnes)	Origin	Grade	Variety	Minimum Price	Maximum Price	Modal Price
21	Chandigarh(Grain Fruit)	233.3			Other	600	1200	900
22	Gujarat							
23	Market	Arrivals (Tonnes)	Origin	Grade	Variety	Minimum Price	Maximum Price	Modal Price
24	Dahod(Veg. Market)	4.2			Onion	400	900	500
25	Kapadvanj	7.2			Other	600	900	750
26	Vadhvan	1.2			Onion	350	500	425
27	Vadodara(Sayajipura)	77.6			Other	500	1150	875
28	Haryana							
29	Market	Arrivals (Tonnes)	Origin	Grade	Variety	Minimum Price	Maximum Price	Modal Price
30	Ambala Cantt.	12			Other	700	1100	800
31	Barwala	31			Onion	1000	1200	1100
32	Barwala(Hisar)	21			Other	800	1000	900
33	Chhachrauli	0.6			Onion	850	1000	850

Source: http://agriexchange.apeda.gov.in/ind_prices/ind_prices.aspx

A second computer program was used to calculate the state-wise average of the modal prices of the crop for each particular day**. All the computed data was collected in a single excel sheet for each crop for the analysis. The contents are explained below.

Column	Madhya Pradesh	Andhra Pradesh	Gujarat	Karnataka	West Bengal
01-Jan-14	747.5	516.82	907.47	670	2006.25
02-Jan-14	872.92	460.73	808.95	900	1868.08
03-Jan-14	862.5	383.5	803.5	515.67	1849.62
04-Jan-14	852.27	412.33	833.26	469.83	2043.12
05-Jan-14	863.64	379.5	875.45	348.73	2129.17
06-Jan-14	795.83	408.64	755.28	512.84	1811.25
07-Jan-14	863.64	325.56	843.79	665.48	1726.79
08-Jan-14	789.29	320	841.94	465.2	1600.31
09-Jan-14	822.92	509.5	924.5	421.71	1503.57
10-Jan-14	800	387.08	914.84	393.54	1507.69
11-Jan-14	670	387.22	898.75	333	1424
12-Jan-14	691.67	370.56	992.45	295.14	1540
13-Jan-14	652.27	340.56	952.22	419.15	1465.36
14-Jan-14	800	307.22	1071	255.71	1473.64
15-Jan-14	685	371.11	1039.58	250.6	1505.33
16-Jan-14	676.67	390	949.56	441.19	1385
17-Jan-14	646.67	361.11	911.5	407.5	1441.25
18-Jan-14	658.33	330.91	951.58	366.44	1318.75
19-Jan-14	625	340.56	918.7	317.57	1308.33
20-Jan-14	550	321.67	780.67	391.19	1335
21-Jan-14	583.33	334.44	804.44	409.38	1157.35
22-Jan-14	666.67	341.25	718.94	389.3	1104.41
23-Jan-14	660	328.33	697.31	369	927.78
24-Jan-14	616.67	368.89	727.06	311.67	1032.92
25-Jan-14	618.18	380	641.8	307	971.25
26-Jan-14	675	375	534	216.75	912.5
27-Jan-14	600	355.56	565.26	336.93	1072
28-Jan-14	645.45	341.1	581.94	325.62	1061.67
29-Jan-14	668.18	330.56	552.5	334.35	996.43
30-Jan-14	590.91	353.12	497.8	287.45	938
31-Jan-14	650	465.71	465.71	309.08	921.43

Column 1 indicates the date. Subsequent columns indicate the average of the modal prices for various states for the corresponding date.

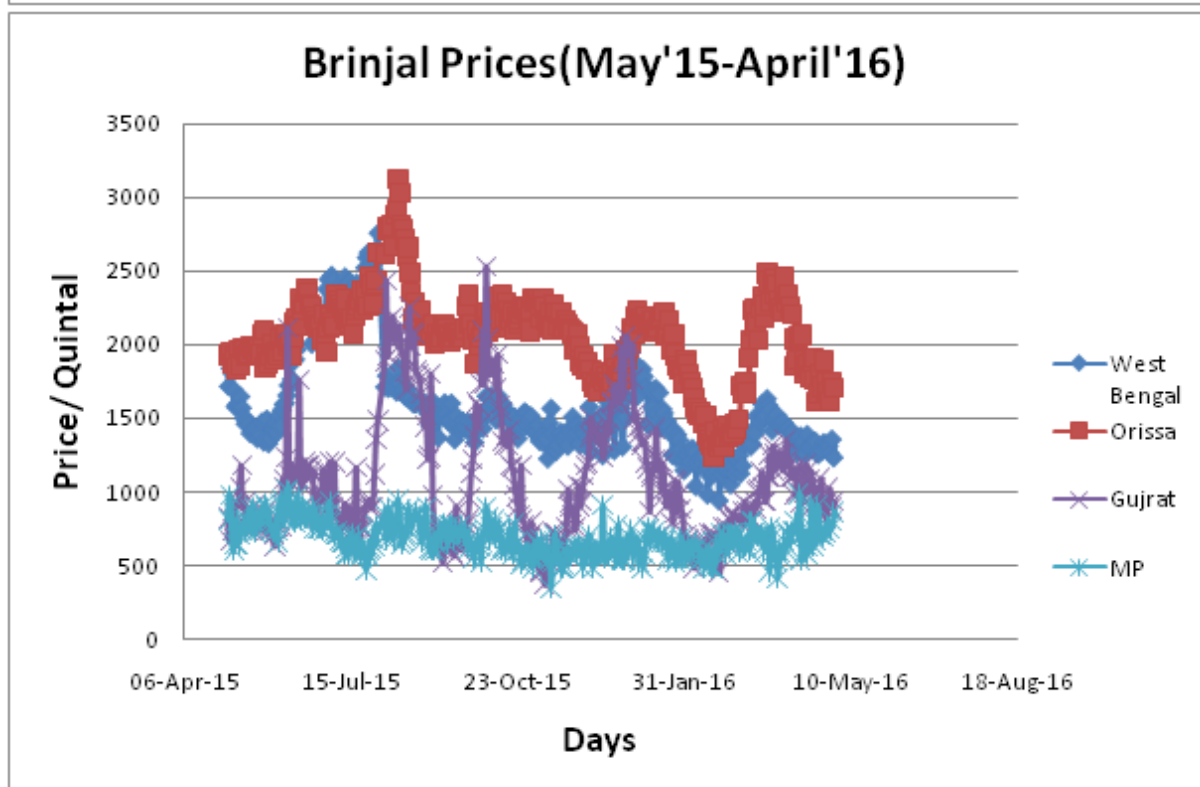
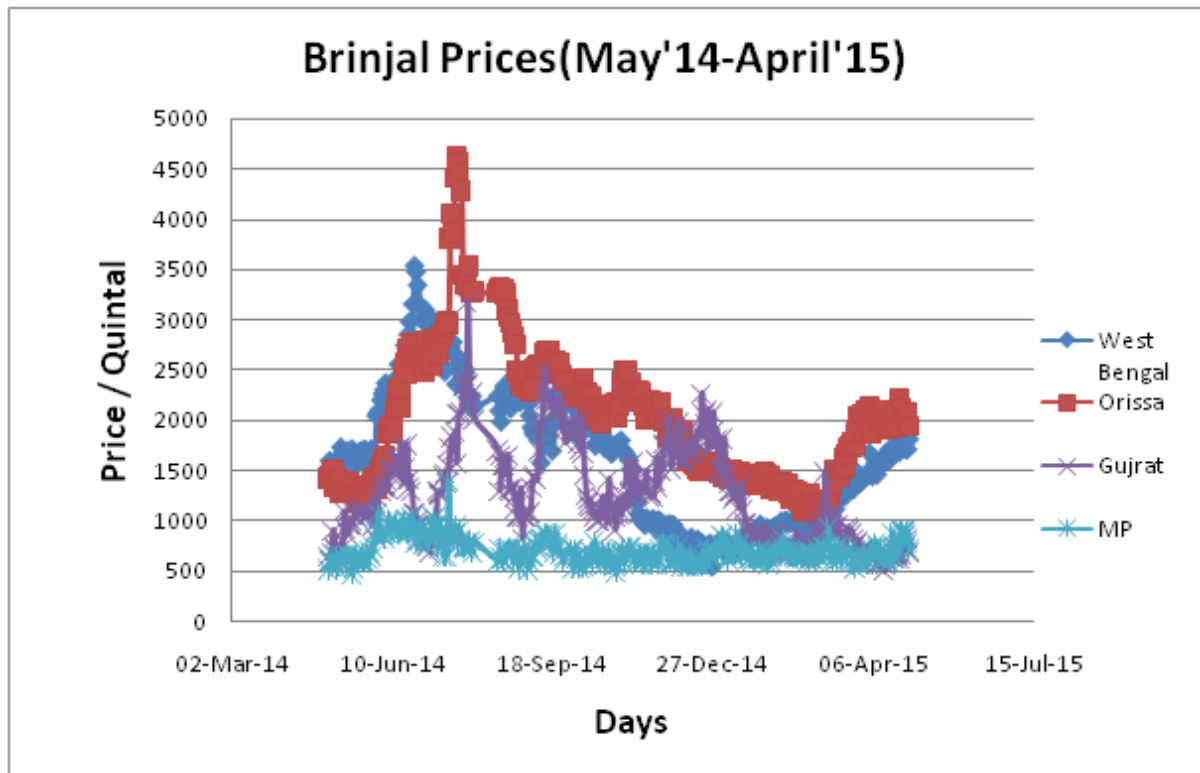
The average modal prices were plotted against time. The variation in the prices over the months during demonetisation was studied and compared to the previous years to arrive at a conclusion.

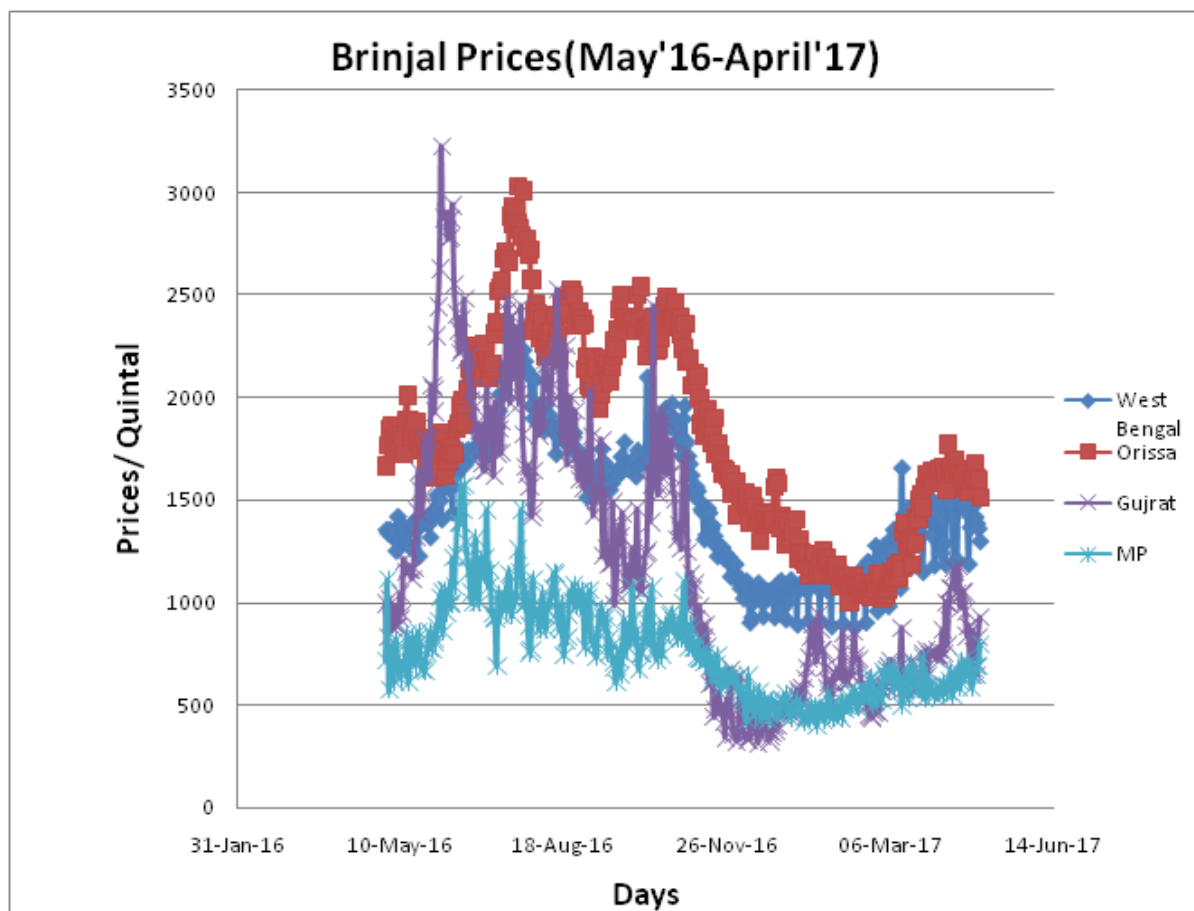
*The daily data for 41 months (January 2014-May 2017) was downloaded for each crop. The total number of files was approximately 5000.

**Both the computer programs are included in the Appendix.

3.3 Observations

Brinjal





West Bengal

	Avg Price* (November-April)	% change compared to 2014-2015	% change compared to 2015-2016
2014-2015	1090.41	--	--
2015-2016	1395.46	+27.98	--
2016-2017	1225.84	+12.42	-12.15

*Avg Price = (Summation of averages of daily modal prices / total number of days)

Orissa

	Avg Price* (November-April)	% change compared to 2014-2015	% change compared to 2015-2016
2014-2015	1681.464	--	--
2015-2016	1926.668	+14.57	--
2016-2017	1419.987	-15.58	-26.32

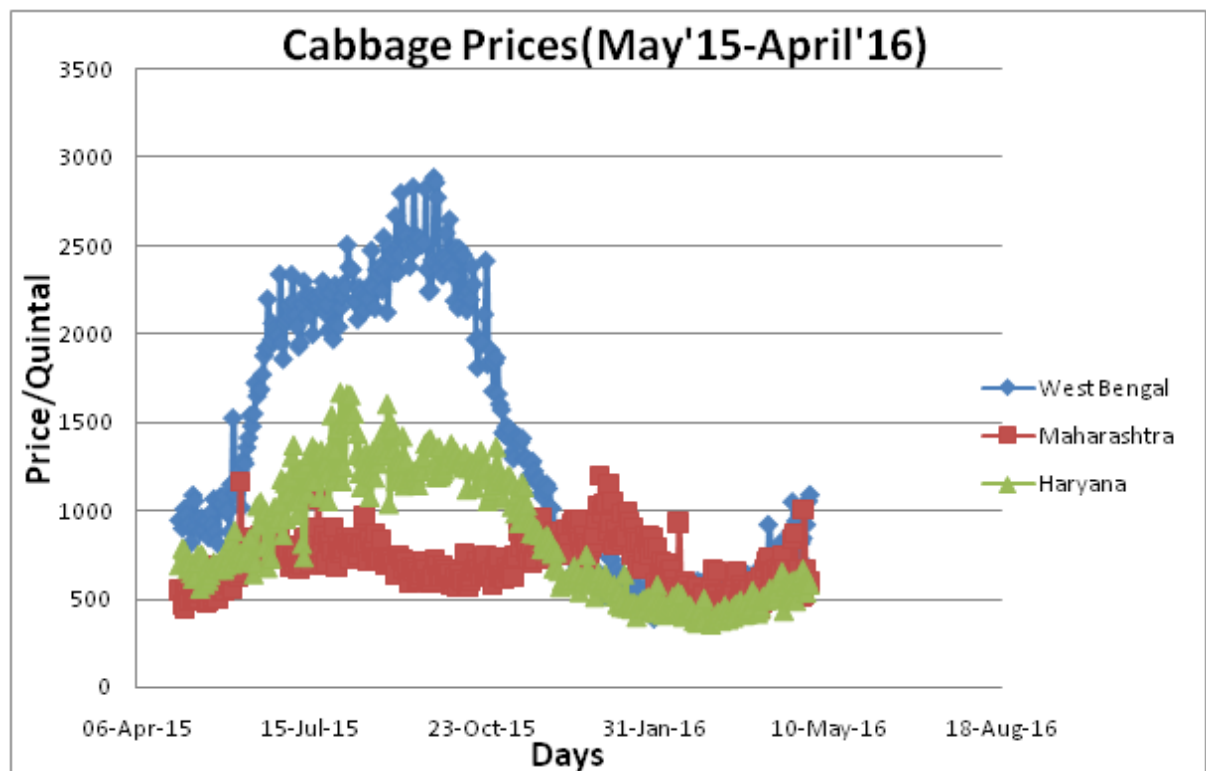
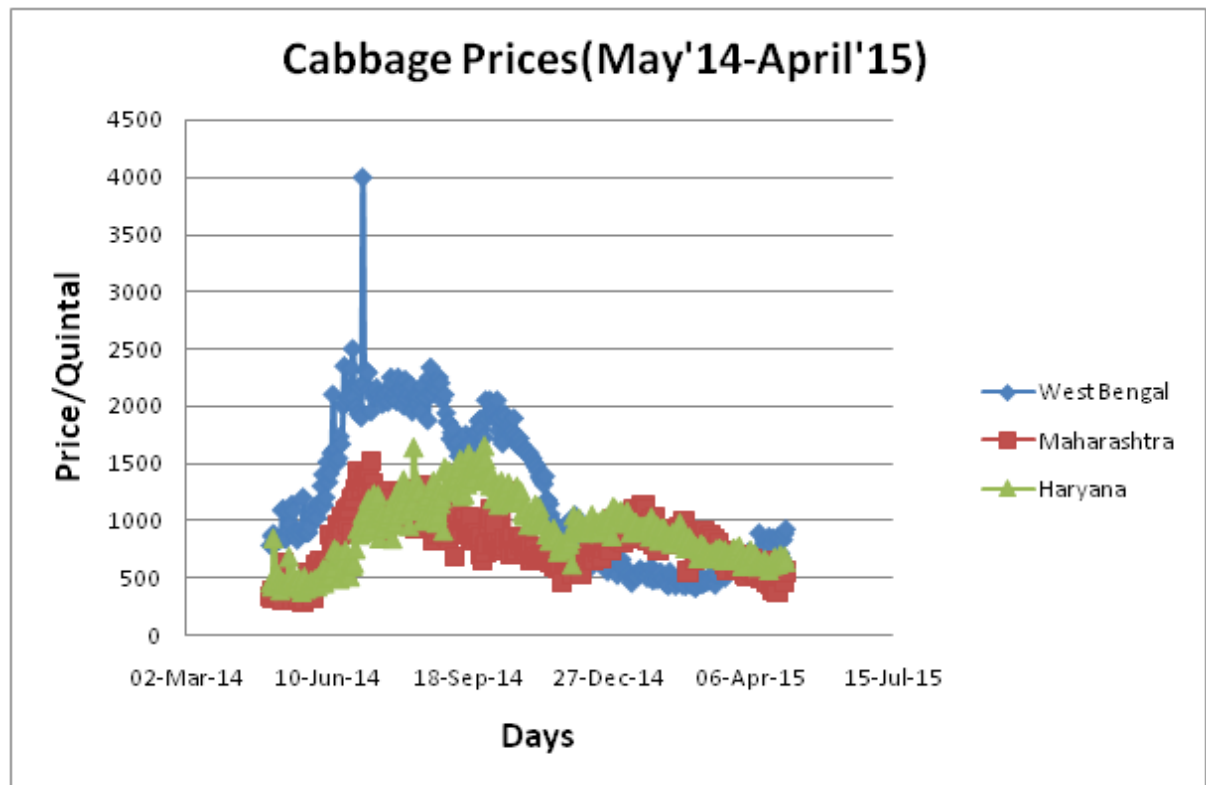
Gujrat

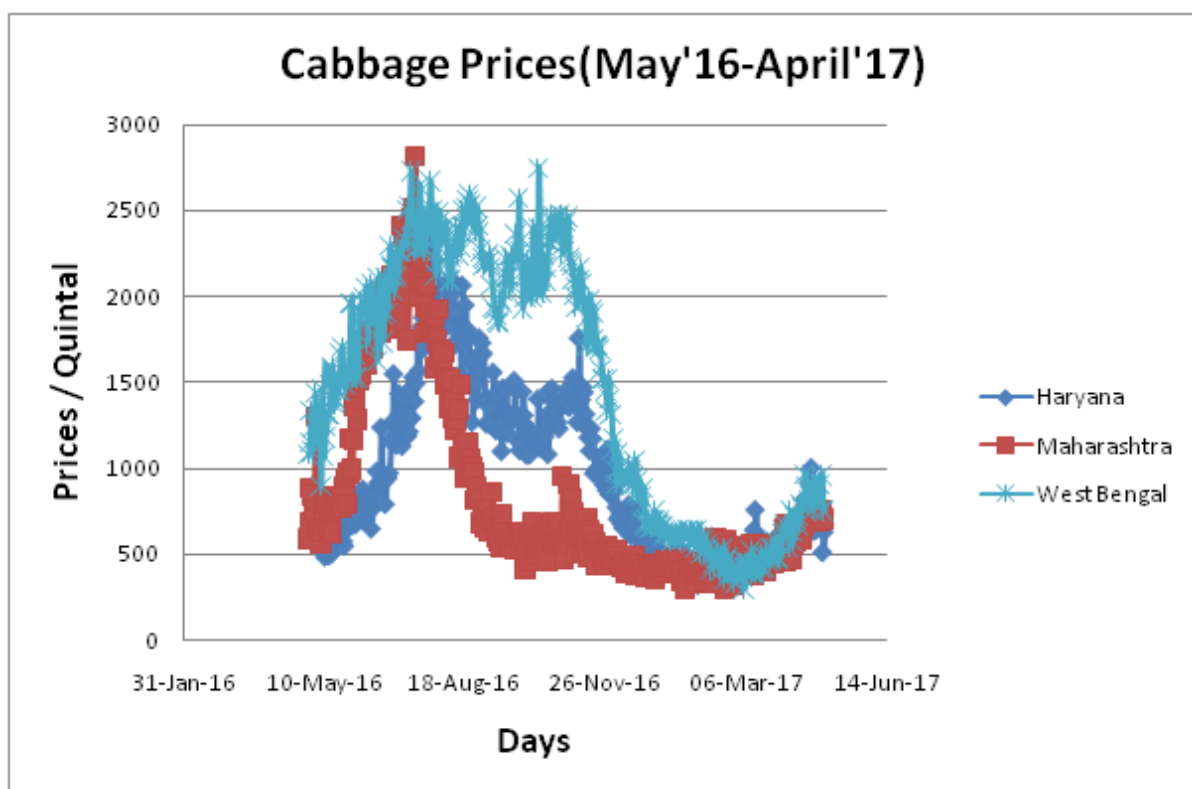
	Avg Price* (November-April)	% change compared to 2014-2015	% change compared to 2015-2016
2014-2015	1112.36	--	--
2015-2016	1013.87	-8.85	--
2016-2017	655.05	-41.11	-35.39

MP

	Avg Price* (November-April)	% change compared to 2014-2015	% change compared to 2015-2016
2014-2015	681.33	--	--
2015-2016	635.92	-6.66	--
2016-2017	579.53	-14.94	-8.77

Cabbage





Haryana

	Avg Price* (November-April)	% change compared to 2014-2015	% change compared to 2015-2016
2014-2015	847.07	--	--
2015-2016	595.16	-29.73	--
2016-2017	651.29	-23.11	+9.43

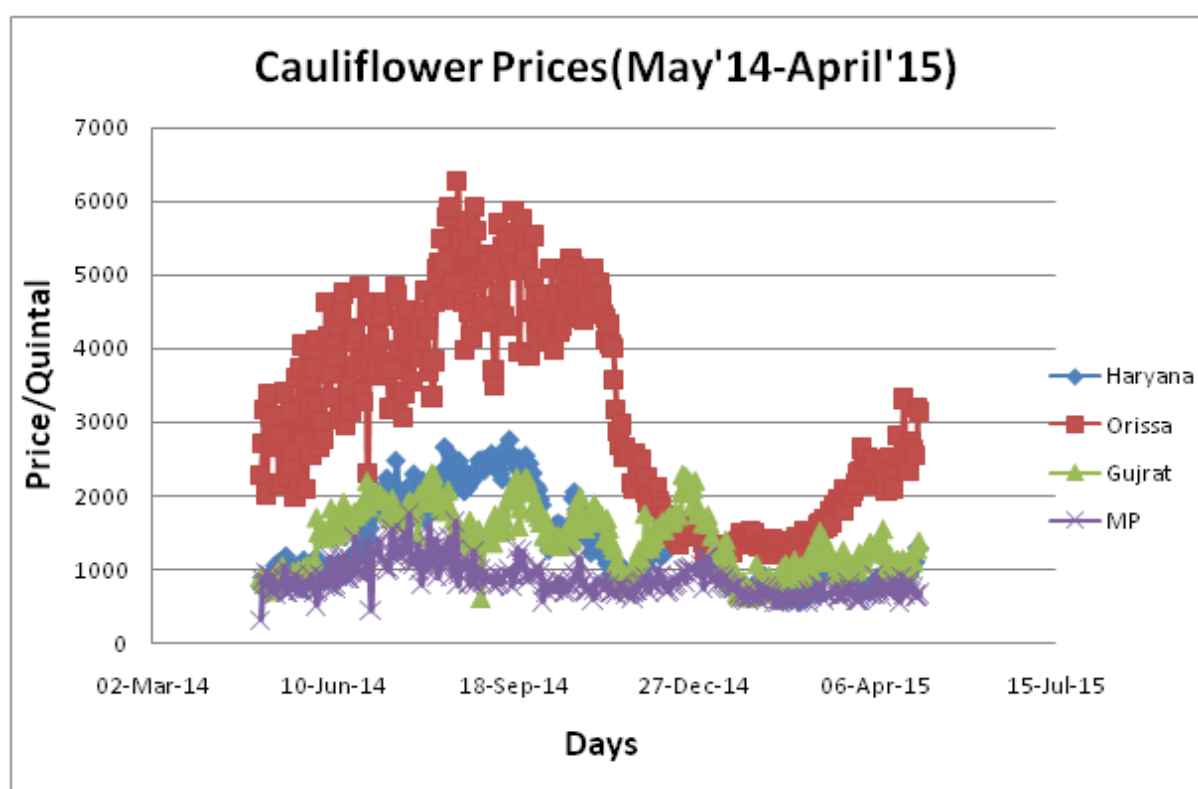
Maharashtra

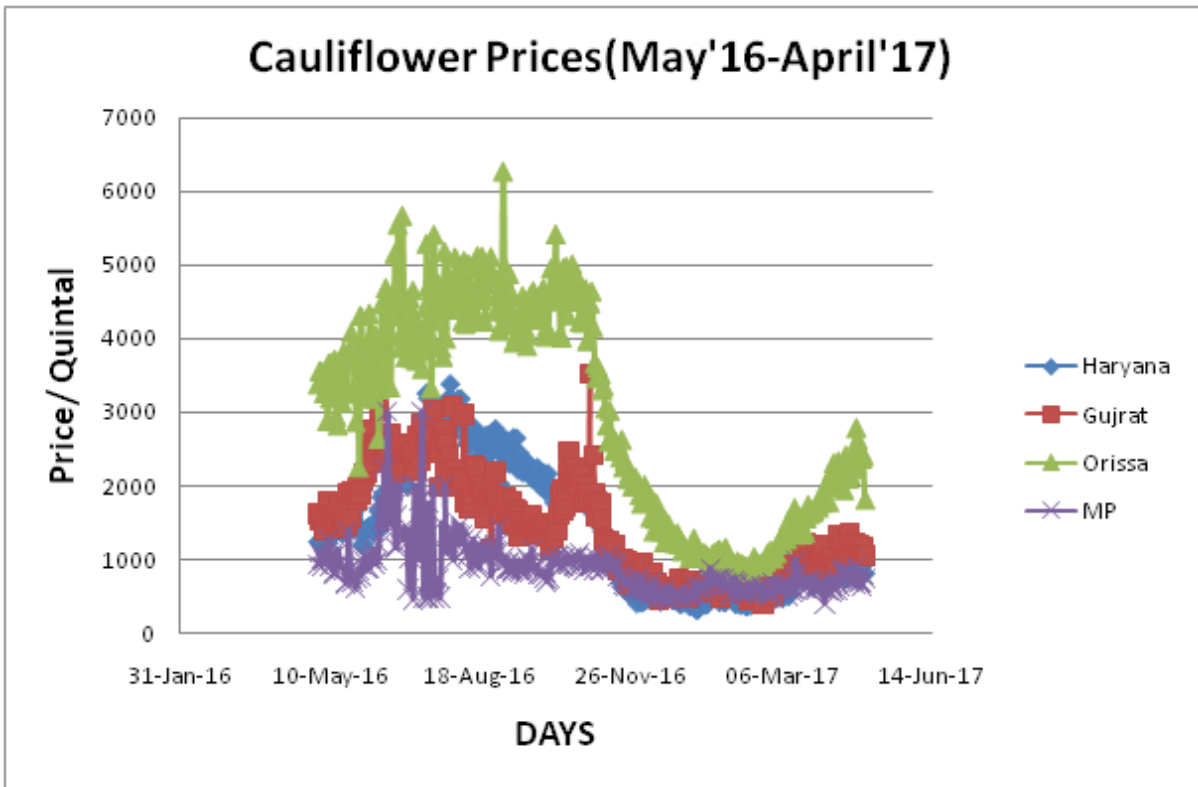
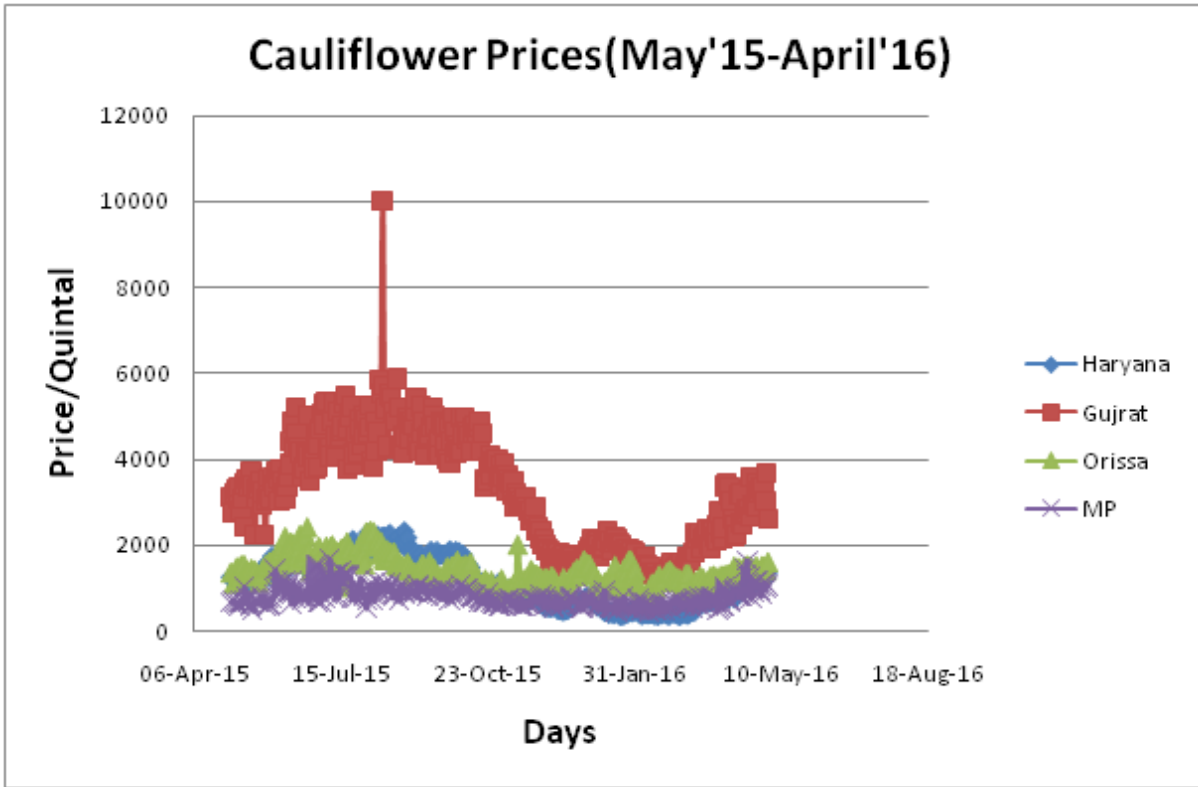
	Avg Price* (November-April)	% change compared to 2014-2015	% change compared to 2015-2016
2014-2015	733.40	--	--
2015-2016	715.64	-2.42	--
2016-2017	495.62	-32.42	-30.74

West Bengal

	Avg Price* (November-April)	% change compared to 2014-2015	% change compared to 2015-2016
2014-2015	691.65	--	--
2015-2016	763.48	+10.38	--
2016-2017	842.03	+21.74	+10.28

Cauliflower





Haryana

	Avg Price* (November-April)	% change compared to 2014-2015	% change compared to 2015-2016
2014-2015	970.33	--	--
2015-2016	680.51	-29.86	--
2016-2017	634.45	-34.61	-6.76

Gujrat

	Avg Price* (November-April)	% change compared to 2014-2015	% change compared to 2015-2016
2014-2015	1214.44	--	--
2015-2016	1240.92	+2.18	--
2016-2017	847.95	-30.17	-31.66

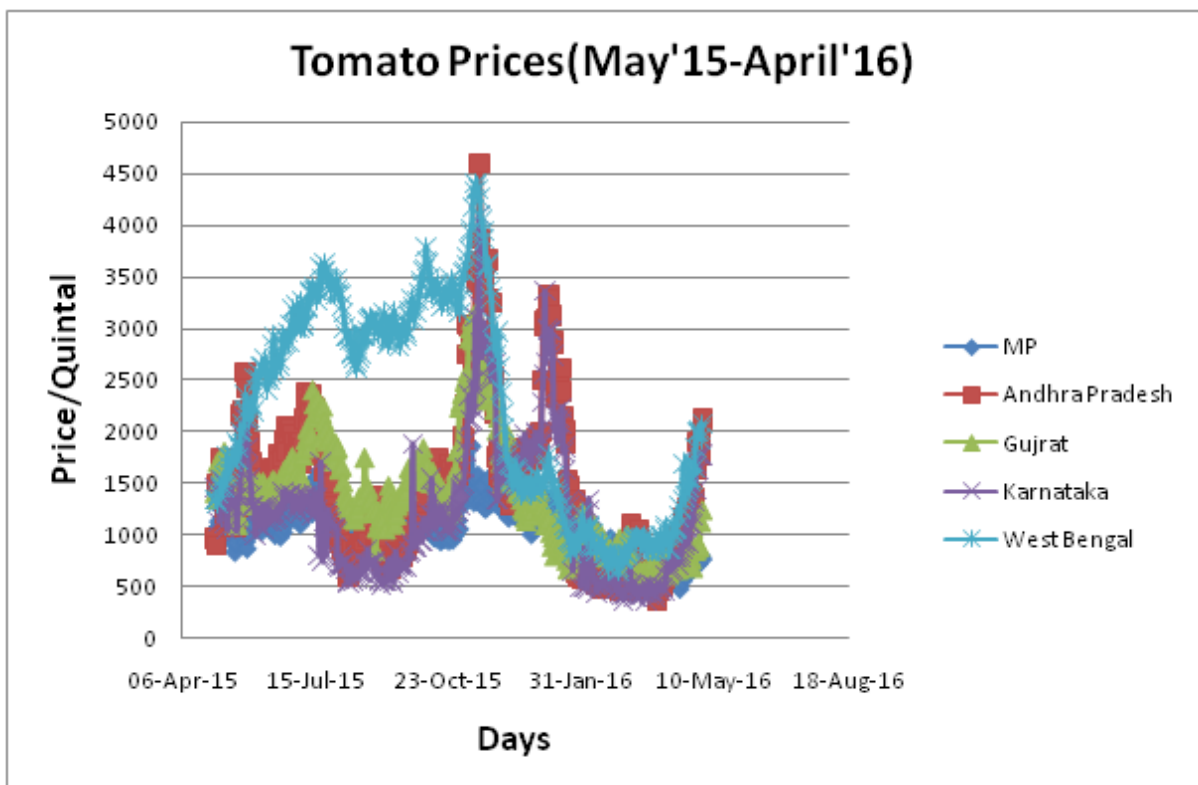
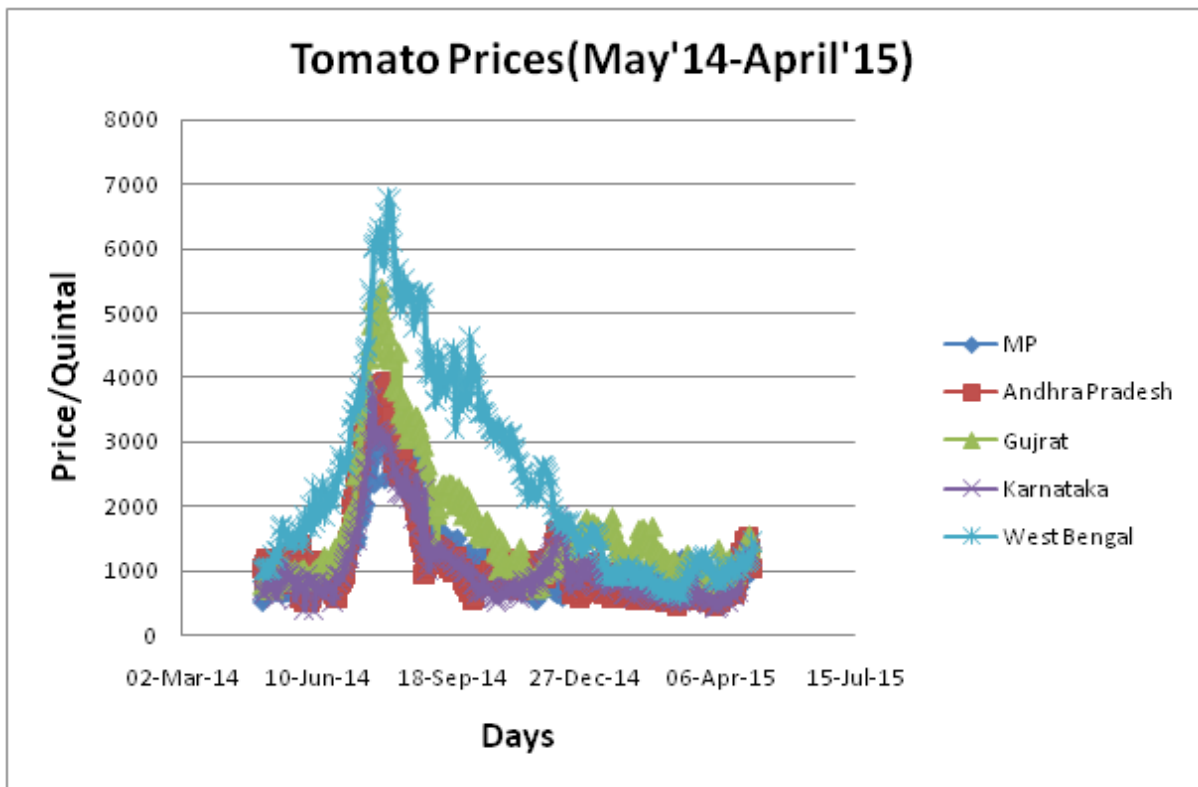
Orissa

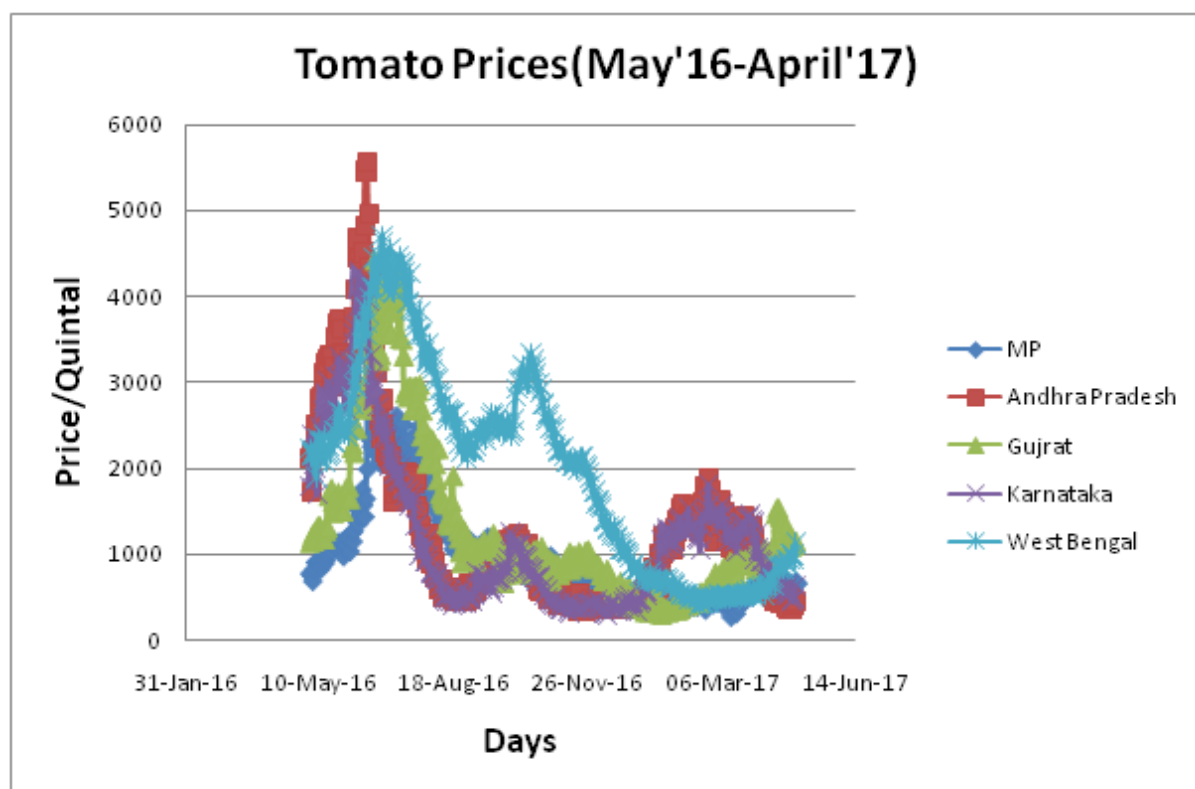
	Avg Price* (November-April)	% change compared to 2014-2015	% change compared to 2015-2016
2014-2015	2001.43	--	--
2015-2016	2191.79	+9.51	--
2016-2017	1666.05	-16.75	-23.98

MP

	Avg Price* (November-April)	% change compared to 2014-2015	% change compared to 2015-2016
2014-2015	750.71	--	--
2015-2016	706.19	-5.93	--
2016-2017	668.79	-10.91	-5.29

Tomato





MP

	Avg Price* (November-April)	% change compared to 2014-2015	% change compared to 2015-2016
2014-2015	819.23	--	--
2015-2016	987.28	+20.51	--
2016-2017	538.08	-34.31	-45.49

Andhra Pradesh

	Avg Price* (November-April)	% change compared to 2014-2015	% change compared to 2015-2016
2014-2015	780.45	--	--
2015-2016	1473.55	+88.73	--
2016-2017	835.72	+7.08	-43.28

Gujrat

	Avg Price* (November-April)	% change compared to 2014-2015	% change compared to 2015-2016
2014-2015	1216.04	--	--
2015-2016	1216.27	0	--
2016-2017	725.22	-40.36	-40.37

Karnataka

	Avg Price* (November-April)	% change compared to 2014-2015	% change compared to 2015-2016
2014-2015	819.57	--	--
2015-2016	1346.30	+64.26	--
2016-2017	832.59	+1.58	-38.15

West Bengal

	Avg Price* (November-April)	% change compared to 2014-2015	% change compared to 2015-2016
2014-2015	1349.46	--	--
2015-2016	1609.47	+19.26	--
2016-2017	964.76	-28.50	-40.05

3.4 Conclusion

From the above calculations we can observe that the vegetable prices were low compared to the previous year in almost every considered state with the exception of West Bengal and Haryana regarding Cabbage.

The Y-O-Y decrease for Brinjal prices ranged from 12% to 35% across states.

The Y-O-Y decrease for Cauliflower prices ranged from 5% to 31% across states.

The Y-O-Y decrease for Tomato prices was the highest. It ranged from 38% to 45% across states.

The Y-O-Y change for Cabbage prices ranged from +10% to -30% across states.

To gain more support for the results of the above data analysis, I also looked at the media coverage of falling vegetable prices due to demonetisation. It also portrays a similar picture. I am quoting few of them.

(1) Dec 02, 2016- Times of India

‘Veggie wholesale rates crash, retail prices only dip in cities’

“In the finely balanced but lucrative economy of vegetable and fruit trade, demonetisation has had a bizarre effect. In distant rural areas, local vegetable prices – both wholesale and retail – have crashed as the oxygen of currency has been suddenly sucked out. Since the whole economy depended on cash, from transport to mandis to purchase prices, this is unsurprising.”

(2) Jan 20, 2017 – scroll.in

‘As demonetisation brings vegetable prices crashing down, farmers wonder what to do with produce’

“The price of tomatoes crashed to 25 paise/kg, prompting farmers in Chhattisgarh, Nashik and Hyderabad to dump their produce.

Kolar is the biggest vegetable-growing region in Karnataka, and houses Asia’s second-largest tomato market. In November, the ruling price of tomatoes in the Kolar market was Rs 3-Rs 5 per kg, or 85% lesser than the same time in 2015.”

(3) March 02, 2017- Hindustan Times

‘Rising output spells grief for vegetable farmers’

“A good monsoon and higher produce have kept vegetable prices down for many months and demonetisation may have only depressed the already lower prices in November and December.

Tomato prices, too, have been down for the almost a year now, save for the spurt seen in June-July 2016. In Madhya Pradesh and Chhattisgarh, where a large number of farmers raise tomatoes, the wholesale prices were a little over ₹300/quintal in February 2017.

In West Bengal and Uttar Pradesh, the prices were around ₹500/quintal. This is far lower than the wholesale prices a year ago.

In February 2016, tomatoes were selling at ₹600/quintal in Madhya Pradesh, ₹440 in Chhattisgarh, and ₹1,100 in Uttar Pradesh. In West Bengal, the prices were slightly lower at around ₹545/ quintal.”

(4) May 06, 2017 - epw.in

‘Impact of demonetisation in Kerala’

“It became clear that, given the multiple levels and varying values of the transactions involved in the informal sector, not all transactions can be made cashless, and definitely not in the short run. The result has been an inability to make payments, even for wages. Moreover, in sectors trading perishables such as vegetables and fruits, pressure to sell the product results in falling prices. Despite the decrease in prices, offtake remains low because of the cash crunch, leading to loss of produce because of spoilage.”

From both the data analysis and the media coverage, it can definitely be said that the agricultural sector and specially, the farmers, suffered huge losses. Their income and profit margins were hurt. It is difficult, due to its informal nature, to estimate the exact monetary loss of the agricultural sector. But even if we consider the produce that was spoiled or dumped due to the low prices, that itself was a great loss. As I have said earlier in Chapter 1, I would wait for some time to see the impact of demonetisation on the whole economy. But as far as the informal sector and specially, the agricultural sector is concerned, there is no denying that the decision has not helped make the situation better. The losses outweigh the gains. As many had predicted last year, the poor were definitely the hardest hit. Although the move might not be the only cause, it did boost many negative effects in the successive months. There were farmer protests across various states including Madhya Pradesh, Gujrat and Maharashtra. Due to the satisfactory monsoon last year, the produce was good, and prices were already low due to this. The timing of the demonetisation only made the situation worse for the farmers. While the working class may get benefitted a lot from the decision tomorrow, the today was ruined for the farmers, who many times struggle to make ends meet on day to day basis. It was a forced exercise for them without any surety of the outcome. Though every farmer I interviewed supported the decision, I do not think anyone would want to knowingly go through the same again. The government should consider every element in the system while making the decision which affects them. It surely should work for the betterment of its citizens, but it need not put them through hardships every time to achieve the same. As India moves towards becoming a prosperous nation, I hope the prosperity gets distributed among the poorer sections as well. I hope we will soon leave the poverty behind and strive for a better tomorrow.

APPENDIX

Python programs used during the project-

(A) For downloading the daily price data of the commodities

```
from selenium import webdriver
from selenium.webdriver.common.keys import Keys
from selenium.webdriver.support.ui import Select
from selenium.webdriver.support.ui import WebDriverWait
from selenium.webdriver.support import expected_conditions as EC
from selenium.webdriver.common.by import By

auto_download_excel = webdriver.FirefoxProfile()
auto_download_excel.set_preference("browser.download.folderList", 2)
auto_download_excel.set_preference("browser.download.manager.showWhenStarting", False)
auto_download_excel.set_preference("browser.download.dir",
"/home/sarvesh/crop")
auto_download_excel.set_preference("browser.helperApps.neverAsk.saveToDisk", "application/vnd.ms-excel")

def daydate(a,b,c):
    date_final = a+"/"+b+"/"+c
    return date_final

def autom(j,k):
    driver = webdriver.Firefox(firefox_profile = auto_download_excel)
    driver.get("http://agriexchange.apeda.gov.in/ind_prices/ind_prices.aspx")
    crop = Select(driver.find_element_by_id('DdlVariety'))
    crop.select_by_visible_text(j)
    date = driver.find_element_by_id("txt_date")
    date.send_keys(k)
    driver.find_element_by_name('btn_click').click()
    #next page
    driver.implicitly_wait(100) # seconds
    myDynamicElement = driver.find_element_by_id("ImageButton1")

    driver.find_element_by_id('ImageButton1').click()
    driver.close()

k = [u'Onion', u'Cabbage', u'Cauliflower', u'Brinjal', u'Tomato']
year = ["2014","2015","2016","2017"]
month = ["01","02","03","04","05","06","07","08","09","10","11","12"]
day28 = ["01", "02", "03", "04", "05", "06", "07", "08", "09", "10", "11", "12", "13", "14", "15", "16", "17", "18", "19", "20", "21", "22", "23", "24", "25", "26", "27", "28"]
day29 = ["01", "02", "03", "04", "05", "06", "07", "08", "09", "10", "11", "12", "13", "14", "15", "16", "17", "18", "19", "20", "21", "22", "23", "24", "25", "26", "27", "28", "29"]
```

```

day30 = ["01", "02", "03", "04", "05", "06", "07", "08", "09", "10",
"11", "12", "13", "14", "15", "16", "17", "18", "19", "20", "21", "22",
"23", "24", "25", "26", "27", "28", "29", "30"]

day31 = ["01", "02", "03", "04", "05", "06", "07", "08", "09", "10",
"11", "12", "13", "14", "15", "16", "17", "18", "19", "20", "21", "22",
"23", "24", "25", "26", "27", "28", "29", "30", "31"]

for a_crop in k:
    for a_year in year:
        for a_month in month:
            name = raw_input("Choosing mm/dd "
+a_month+"/"+a_year+ " and crop " + a_crop + ". Press y to continue : ")
            if name == "y" :
                if ( a_month == "01" or a_month == "03"
or a_month == "05" or a_month == "07" or a_month == "08" or a_month ==
"10" or a_month == "12"):
                    for a_day in day31:

                        m=daydate(a_day,a_month,a_year)
                                autom(a_crop,m)
                                print m
                                if ( a_month == "04" or a_month == "06"
or a_month == "09" or a_month == "11"):
                                    for a_day in day30:

                                        m=daydate(a_day,a_month,a_year)
                                                autom(a_crop,m)
                                                if ( a_month == "02"):
                                                    if a_year == "16" :
                                                        for a_day in day29:

m=daydate(a_day,a_month,a_year)
                                                autom(a_crop,m)
else:
                                    for a_day in day28:

m=daydate(a_day,a_month,a_year)
                                                autom(a_crop,m)

```

(B) For computing the average modal price of the commodities

```

from bs4 import BeautifulSoup
from datetime import datetime
import csv

from os import listdir
from os.path import isfile, join

# folder with xls files
FOLDER = './'

xls_files = [join(FOLDER, f) for f in listdir(FOLDER)]

```

```

        if isfile(join(FOLDER, f)) and f[-3:] == 'xls']

# {date: {state: average_price,...},
#  another_date:{state, average_price, ...},...}
output = {}

for x_file in xls_files:
    data = open(x_file, 'r').read()
    soup = BeautifulSoup(data, "lxml")

    # date
    date = soup.find("span", {"id": "lbldate"})
    try:
        date = datetime.strptime(date.text, '%d/%m/%Y')
    except Exception as e:
        print("Error {0} in {1}, skip it".format(e, x_file))
        continue
    else:
        output[date] = {}

    # states
    states = soup.find_all("span", "subhead1")
    states = [x.text for x in states if "Product:" not
              in x.text and "Onion" not in x.text]

    tables = soup.find_all(
        "table", id=lambda x: x and x.startswith('DataList'))

    if len(tables) - len(states) == 1:
        tables = tables[1:]

    assert len(states) == len(tables), \
        'Error in {0} len(states) != len(tables)'.format(x_file)

    for i in range(len(states)):
        _sum = 0
        trs = tables[i].find_all("tr", {"align": "right", "class":
None})
        failed_counter = 0
        for j, tr in enumerate(trs):
            tds = tr.find_all("td")
            try:
                _sum += float(tds[-1].text)
            except ValueError:
                failed_counter += 1
            if j-failed_counter+1 == 0:
                output[date][states[i]] = ''
            else:
                average_price = _sum / (j-failed_counter+1)
                output[date][states[i]] = "%.2f" % average_price

# figure out all states
all_states = []
for key in output.keys():
    all_states += output[key].keys()
all_states = list(set(all_states))

# printing results
with open('output.csv', 'wb') as csvfile:
    filewriter = csv.writer(csvfile, delimiter=',',

```

```
        quotechar='"', quoting=csv.QUOTE_MINIMAL)
for i, key in enumerate(sorted(output)):
    if i == 0:
        filewriter.writerow(["Date"] + all_states)
    output_row = [output[key].get(state, '') for state in
all_states]
    filewriter.writerow([key]+output_row)
```


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