

The Tragedy of Modern India: Farmer Suicides in 21st Century India

A Case Study Analysis

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Abstract

One of the symptoms of the agrarian crisis in India has been the continuous prevalence of farmer suicides. Though some states have exhibited positive trends, this research paper goes above and beyond to uncover the actual reality of the situation. The research aim was to conduct a case study analysis of the phenomenon of farmer suicides in 21st century India by evaluating the National Crime Records Bureau (NCRB) data on the percentage of farmer suicides out of the total suicides of 21 Indian states, respectively, for 2001, 2011, and 2016. Moreover, in-depth analyses of the farmer suicides phenomena, as manifested in the five particular states of Maharashtra, Punjab, Karnataka, Tamil Nadu, and Chhattisgarh would provide a rich and comprehensive perspective with their unique issues to supplement the quantitative analyses. The results showed that both the states and the years had a statistically significant effect on farmer suicides. While the mean rate of farmer suicides across the states appeared to have declined over the three years under investigation, suicide rates remained high for Maharashtra and Karnataka, while the decline in the rate for states such as Punjab and Chhattisgarh was likely to be a result of under-reporting. In identifying the causes of farmer suicides, the examination of the literature on specific states pointed to a complex interaction of diverse factors — bad weather, lack of adequate investments in agriculture, inadequate access to affordable resources, poor pricing supports, among others — which would lead to the farmers' increased indebtedness. When farmers are unable to repay their debts, they would end their lives. Based on the factors highlighted, governments need to implement policies like price supports, debt relief and investments in the infrastructure, and subsidies for farmers to purchase the necessary equipment so that they can achieve a proper livelihood. Instead of being a burden to the country, the farmers can contribute to the alleviation of India's dependence on food imports to feed its growing urban population.

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The continuous prevalence of farmer suicides is a blight on the glittering image of modern India with its thriving IT sector, growing segment of the rich, and the skyline of skyscrapers (Crabtree, 2018; Khan, 2019). The plight of farmers is one of the greatest paradoxes about modern India: despite its relatively high GDP growth rate in the last two decades, it has failed to alleviate poverty and promote economic equality (Ghosh, 2017; Qazi, 2017). In fact, in his comparison of the Gini coefficient- a standardised measure of economic inequality between the 1992-1993 and 2009-2010, Aluwalia (2011) found that consumption inequality had actually increased. A primary group that has been left behind in India's modernisation process has been India's farmers, even though it constitutes 55% of the country's population (Dalwai et al., 2017).

More than two decades ago, when the Indian government decided to stimulate India's economy, it embarked on a structural reform that stimulated "more glamorous, urban industries like information technology, financial services and construction" (Bajaj, 2011) in a bid to promote foreign trade, investment, and the flow of capital (Dev, 2011). Yet this comprehensive reform had excluded the agricultural sector (Dev, 2011). In fact, as a consequence of India's opening of the market to the world, the government had cut farm subsidies and lowered tariffs that had once shielded the farmers from outside competition (Qazi, 2017).

It would seem that the well-being of farmers has never been a top priority for successive Indian governments. Even at the height of the government's investments in the agricultural sector during the Green Revolution during the 1960s and 1970s, its sole purpose was to grow enough food for its rising population (Dasgupta, 1977). Unfortunately, the so-called success of the Green Revolution that led to increased agricultural yield, through the reliance "high-yield seeds, fossil fuels for fertilisers, modern methods of plant breeding and the massive use of pesticides and equipment", as well as a "heavy dependence on irrigation" has left behind a devastating legacy of "soil degradation, groundwater depletion and contamination along with declining yields" (Qazi, 2017, par. 6).

Today, India's agricultural sector is in a dire state, characterised by small and marginal farmers making up 80% of all farm households (Qazi, 2017). With a high level of dependence on manual labour, low level of mechanisation and the absence of proper infrastructure for critical functions such as irrigation systems and temperature-controlled warehouses, it is little wonder that the NITI Aayog, a policy think tank, considered the agricultural sector to be "28 years behind in its expected development" (as cited in Qazi, 2017, par. 2). Despite successive governments' announcement of steps to help improve the incomes of farmers including the increase in minimum support prices (MSPs), increased procurement, and price compensating payments, the price of many crops continued to remain well below the MSP's which had been declared the previous year (Aditya et al., 2017). Therefore, an average farm household earns less than Rs 6,500 a month according to the 70th Situation of Agricultural Households in India, conducted by National Sample Survey Office (NSSO) (as cited in Qazi, 2017). These households are essentially dependent on government assistance and "forgiveness of farm loans" for their survival (Qazi, 2017, par. 4).

Left to their own devices, in the face of a lack of subsidies and external competition, Indian farmers have been turning more to genetically engineering seeds that could produce higher yields and greater resistance to deadly pests (Qazi, 2017). Unfortunately, they cost three times the price of traditional seeds. This situation has, in turn, led to farmers seeking loans from moneylenders who charge high interest rates, to purchase these seeds that they hope would produce the bumper crop they most desperately need. According to a survey by the National Bank for Agriculture and Rural Development conducted during the 2015-2016 period, 52 percent of Indian farmers were in debt (as cited in "Agri Households' Average Earnings," 2018). As they descend into a debt trap, unable to earn more than they owe, farmers ultimately resort to suicide to free themselves from their difficult lives (Qazi, 2017).

Although there are indications that the rate of farmer suicides is declining, it remains a serious problem in India. In 2016, 11,379 people working in the agricultural sector committed suicide, constituting 8.7% of the suicides in the country, according to the "Accidental Deaths & Suicides in India" (ADSI-2016), published by the National Crimes Reporting Bureau (NCRB, 2016). Although the juxtaposition of the proportion of farmer suicides from 2013-2016 showed that the percentage shared had decreased from 9.4% to 8.7% during the 2015-2016 period, after rising from the 8.7% to 9.4 during the 2013-2014 period, the reality is far less sanguine (Khan, 2019). The veracity of the latest figures had also come under

question, as they had only been released after significant delay in response to a barrage of criticism (Khan, 2019). Moreover, there were six states and five Union Territories (UTs) that reported zero instances of farmer suicides, thus suggesting a strong possibility of under-reporting (“Farmer Suicides”, 2018). Even then, states that were susceptible to weather variations, such as Maharashtra and Karnataka, were affected by astronomically high proportions of suicide rates (Khan, 2019).

In conducting a case study analysis of the age-old farmer suicides crisis in 21st century India, as they had transpired in 21 states across three separate years, this research study sought to offer a broad, but also in-depth, examination of the phenomenon. Its intent is to put together an integrated picture of the root causes of the crisis afflicting the individual states and identify potential deep-seated solutions that go beyond piecemeal efforts.

Description of Research Study

Research Aim and Research Approach

The research aim was to conduct a case study analysis of the phenomenon of farmer suicides in 21st century India by analysing the data from 21 Indian states from three different years. As defined by Yin (2009), a case study analysis concerns a real-life investigation into a phenomenon within a specific context in order to identify underlying factors and patterns that have contributed to the situation (Yin, 2009, p. 13). There, it is highly appropriate for this research study that involved an in-depth evaluation of the phenomenon of farmer suicides in the real-life contexts of several Indian states in the 21st century.

With case studies, data could be gathered from a diversity of sources and analysed in multiple ways. In this case, secondary data about farmer suicides as a percentage share of total suicides in the 21 Indian states across the years of 2001, 2011, and 2016, obtained from the NCRB were gathered and compared. The data was analysed using Two-Factor ANOVA without Replication to compare the effects of the states and years on farmer suicides as a percentage share of total suicides of corresponding states.

- Null Hypothesis: The states and years exert no effect on farmer suicides as a percentage share of total suicides of corresponding states.

- Alternative Hypothesis: The states and years exert an effect on farmer suicides as a percentage share of total suicides of corresponding states.

Furthermore, the data for the individual states during the three separate years were depicted in a bar graph. The visual depiction was used to generate even more detailed insights into the general and particular trends of farmer suicide rates over the last two decades. Finally, relevant information from existing literature, regarding factors that influence farmer suicides, were examined through mini case study analyses of four states with distinctive trends. The similarities and differences in how the phenomenon transpires between the states offered additional insights.

Data Collection

Quantitative data regarding farmer suicides (as a percentage of total suicide for each state) for 2001 and 2011 were obtained from Nagaraj et al.'s (2014) article entitled "Farmer suicides in India: Magnitudes, Trends, and Spatial Patterns, 1997–2012". According to the authors, they had obtained the data from the NCRB's ADIS reports of the corresponding years. The data from 2016 were obtained from NCRB's (2016) ADIS-16 report.

Data Analysis

Descriptive statistics were used to present the overall trends of farmers' suicide rate over the three separate years of comparison. To analyse the statistical significance of the effects of the states and the years on farmer suicides as a percentage share of total suicides of corresponding states, a 2-way ANOVA Without Replication test was run. Furthermore, the presentation of the raw data in a bar graph also allowed for a detailed examination of the changes of farmer suicides as a percentage share of corresponding total suicides. Finally, additional information used for the interpretation of the quantitative data was obtained from a wide variety of sources. They included scholarly articles and official reports, as well as online articles and newspaper articles. Although the latter category would not be considered to be academic in nature, they were used because they provided information obtained about official reports and offered the most updated information.

Results

In this section, all the results from the statistical analyses of secondary data, as outlined in the “Description of Research Study” section, are presented and examined in detail. The phenomenon of the farmer suicides in India in the 21st century, in terms of the overall trends for 21 states in India, and underlying causes of a few selected states, are examined. The raw data can be found in the Appendix.

On the whole, it would seem that the mean rate of farmer suicides in India, as a percentage of their corresponding states’ total suicide rates, declined over the three years under investigation: 2001 ($M = 13.05\%$, $SD = 7.69$), 2011 ($M = 9.75\%$, $SD = 5.47$), and 2016 ($M = 5.60\%$, $SD = 6.38$) (see Table 1).

Table 1

Descriptive Statistics of Mean Farmers Suicide Rates (as Percentage of Total Rate of Suicides in Each State Studied)

2001		2011		2016	
Mean	13.04761905	Mean	9.747619048	Mean	5.595238095
Standard Error	1.679691285	Standard Error	1.193267204	Standard Error	1.392195187
Median	10.3	Median	9.8	Median	3.2
Standard Deviation	7.697312456	Standard Deviation	5.468237289	Standard Deviation	6.379839825
Sample Variance	59.24861905	Sample Variance	29.90161905	Sample Variance	40.70235619

Similarly, the bar graph (Figure 1) very evidently displays declines in the farmers’ suicide rates across the three years taken into consideration. What is particularly encouraging were the noticeable drops across the years in the states of Chhattisgarh, Kerala, and Uttar Pradesh. In the case of Chhattisgarh, farmers’ suicide rate declined from 36.1% in 2001 to 18.8% and 10.2% in 2011 and 2016, respectively. Similarly, in Kerala, the rate fell from 10.8% in 2011 to 4.2% in 2016. Following a similar downward trend, in Uttar Pradesh, the rate decreased from 18.5% in 2001 to 13% in 2011, followed by a drastic decline to 5.2% in 2016. Haryana

is also encouraging: even though the rate initially increased from 7.2% in 2001 to 11.8% in 2011, it fell to 6.8% in 2016.

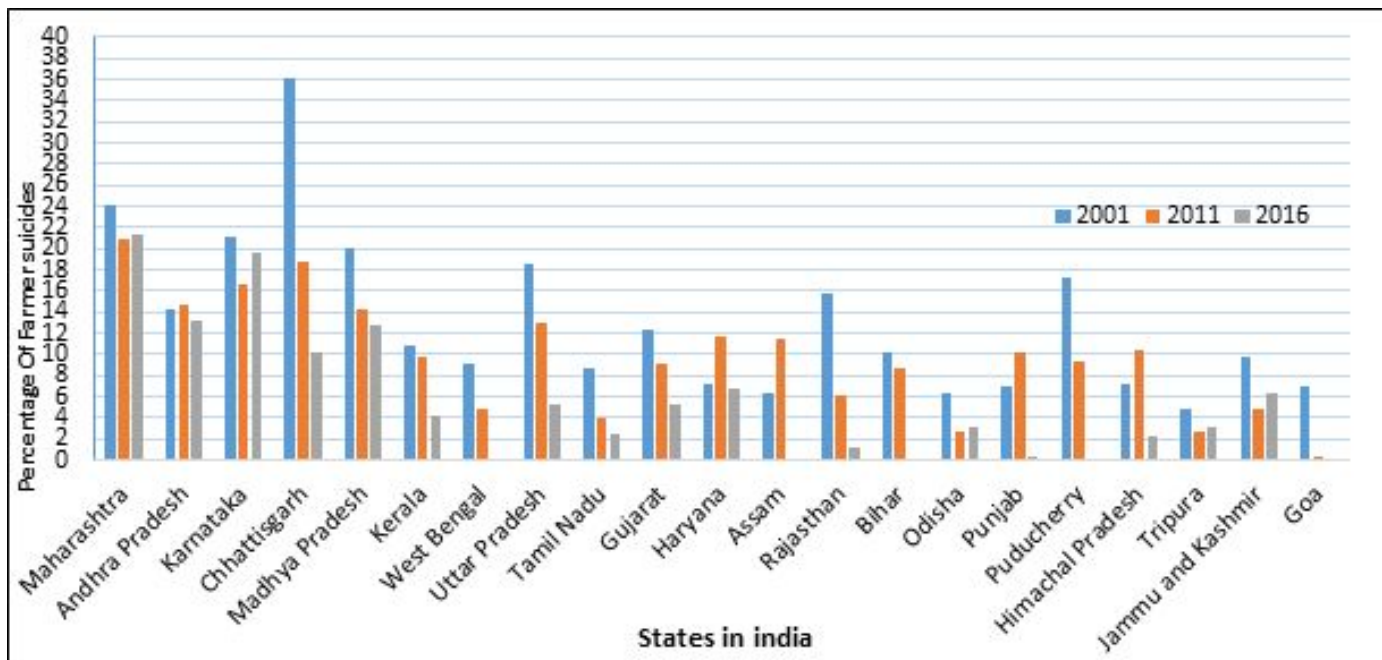
However, despite these improvements, it is important to notice some disturbing trends that illuminate the persistence of the crisis of farmer suicides, which is also captured prominently in Figure 1.

First, states like Maharashtra, Andhra Pradesh and Madhya Pradesh, continued to show high percentages of farmer suicide compared to the total suicides in their states. For instance, in Maharashtra, an initial decline from 24.2% to 20.9% from 2001 to 2011 was countered by an upward trend in 2016 with the percentage of farmer suicides rising to 21.3% of the total suicides in the state, instead of declining.

Second, apart from Maharashtra, the 2016 rates of states like Karnataka, Tripura, Odisha, along with Jammu and Kashmir, are even higher than in the preceding years, thus bucking the overall trend. In Karnataka, the rate increased to 19.6% in 2016 from 16.6% in 2011. Similarly, in the cases of Tripura, Odisha, along with Jammu and Kashmir, the rate rose from 2.8% to 3.2%, 2.7% to 3.1%, and 4.9% to 6.4%, when comparing the figures of 2011 and 2016, respectively.

Finally, while it looks like there are declining trends across the years in most of the states, it is important to be aware of the underreporting in 2016 and the reluctance of the government to even release government statistics. As a result, no data was released from certain states. Even in the cases of the states with some data, the low figures suggest that the 2016 data in these instances may not be genuinely representative of the reality.

Figure 1



Percentage of Farmers' Suicide out of Total Suicides in Indian States for 2001, 2011, and 2016

To determine whether the state and the year had a statistically significant on the percentage share of farmer suicides in terms of the total suicide rates of the corresponding states, a Two-Way ANOVA Without Replication was run. As shown in Table 2, there was a significant main effect for the state, $F(20, 40) = 7.42, p < .01$, and a significant main effect for the year, $F(2, 40) = 21.25, p < .01$. This means that the changes in the mean farmer suicide percentages across the years and the states are both statistically significant.

Table 2

Two-Way ANOVA Without Replication — Effects of State and Year on Percentage Share of Farmer Suicides in Each State (Based on Total State Suicides)

<i>SUMMARY</i>	<i>Count</i>	<i>Sum</i>	<i>Average</i>	<i>Variance</i>
Maharashtra	3	66.4	22.13333333	3.243333333
Andhra Pradesh	3	42.2	14.06666667	0.463333333
Karnataka	3	57.3	19.1	5.25
Chhattisgarh	3	65.1	21.7	174.01
Madhya Pradesh	3	47	15.66666667	14.72333333
Kerala	3	24.8	8.266666667	12.65333333
West Bengal	3	14	4.666666667	20.74333333
Uttar Pradesh	3	36.7	12.23333333	44.66333333
Tamil Nadu	3	15.1	5.033333333	10.57333333
Gujarat	3	26.7	8.9	12.99
Haryana	3	25.8	8.6	7.72
Assam	3	17.72	5.906666667	32.49213333
Rajasthan	3	23.2	7.733333333	55.05333333
Bihar	3	19.1	6.366666667	30.96333333
Odisha	3	12.1	4.033333333	3.893333333
Punjab	3	17.34	5.78	24.7552
Puducherry	3	26.6	8.866666667	74.17333333
Himachal Pradesh	3	19.8	6.6	17.08
Tripura	3	10.8	3.6	1.12
Jammu and Kashmir	3	21.1	7.033333333	6.303333333
Goa	3	7.34	2.446666667	15.56653333

2001	21	274	13.04761905	59.24861905
2011	21	204.7	9.747619048	29.90161905
2016	21	117.5	5.595238095	40.70235619

Source of Variation	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Rows (State)	2045.875898	20	102.2937949	7.423675724	4.53577E-08	1.838859349
Columns (Year)	585.691746	2	292.845873	21.25244058	5.14763E-07	3.23172699
Error	551.1759873	40	13.77939968			3
Total	3182.743632	62				

What the Sum of Squares column also highlights is the far larger effect of the differences between the states ($SS = 2045.88$) than the year ($SS = 585.69$) on the farmer suicides as percentage share of the total suicides of their corresponding states. Therefore, it is only logical to delve deeper into the trends of the phenomenon of farmer suicides by conducting mini-case studies of individual states. Due to the constraints of the length of this study, only five states — Maharashtra, Punjab, Karnataka, Tamil Nadu, and Chhattisgarh with varying patterns of percentage shares — were examined in order to identify and analyse the underlying causes of farmer suicides.

Maharashtra

As shown in Figure 1, Maharashtra's farmer suicide percentage share of the state's total suicide rate had hovered between 20% and 25% for the past 15 years. A detailed examination of the agricultural situation of the state reveals obvious reasons. First of all, about 20,000 villages in 20 districts of Maharashtra are drought-stricken (Talule, 2020). Further exacerbating the situation is the reality that the state's irrigation coverage is less than half the national average (Talule, 2020). Therefore, farmers in the state are constantly dealing with distressing conditions due to droughts and erratic monsoons (Talule, 2020). During the drought of 2014, many rural families from the districts of Marathwada and Vidarbha had to migrate to Pune and Mumbai for water and employment opportunities. They had had to sell all their cattle, as there was neither water nor fodder for them (Talule, 2020).

Second, farmers had also suffered from the sales of fake seeds. Crops like Bt. Cotton - a genetically modified variety that is pest-resistant - could fail to generate any yield due to fake seeds (Wadke, 2017). Unfortunately, farmers can only learn about the fake seeds once the grown crop fails to blossom (Talule, 2020). This was the case in 1916, leading to widespread complaints from the districts of Marathwada and Vidarbha - hard-hit villages that were highly dependent on agriculture. Although the state banned the culprit company from selling its 12 varieties of seeds of Bt. Cotton (Talule, 2020), the farmers had already lost their crops and incurred devastating losses (Talule, 2020).

At the same time, a bumper crop could also put farmers at a disadvantage, particularly when institutional mechanisms are not in place to mitigate against such situations. For instance, good crops of *tur* (“Pigeon Pea”) and soya bean in 2016, as well as *chana* (“chickpea”) in Marathwada in 2017, led to market prices nose-diving for these crops (Talule, 2020). Because the procurement mechanism was not ready, the farmers had to sell their produce to the traders at prices below the MSP (Talule, 2020).

Ultimately, a number of factors interact with one another to produce high rates of farmer suicides that include “issues of debt, hyper-commercialisation, exploding input costs, water-use patterns, and severe price shocks and price volatility” (Sainath, 2014, par. 27). Nonetheless, all of these factors can be alleviated by state policies that can ease the burden faced by farmers in dealing with these issues.

Karnataka

As shown in Figure 1, the state of Karnataka has constantly had a high farmer suicide rate, hovering between 16.6% to 21.1% of the state’s total suicides. Even though the state exhibited a rather significant fall in the rate from 21.1% to 16.6% from 2001 to 2011, it reported an increase to 19.6% of the total suicides in 2016. This clearly demonstrates the entrenched nature of this phenomenon in this state, warranting a thorough examination of the underlying factors contributing to the continuous high rate of farmer suicides in the state.

The overall picture of the reasons for farmer suicides in Karnataka mirrors the situation in other states in India:

- Crop failure (as mentioned by 95% of the victim households) due to failure of rain and attacks by pests and diseases, which clash against expectations of higher output;

- Lack of irrigation facilities;
- Low prices for the produce;
- Resultant indebtedness compounded by pressure from private money lenders who had charged them high interest rates and recovery notices from the institutional resources; and
- Inability to care for themselves and their families such as paying for basic necessities and children's school fees (Manjunatha & Ramappa, 2017).

The decisions of policymakers have also compounded the situation for farmers in Karnataka. For example, when the different governments fix MSPs, they do so without factoring the costs of production (Basha, 2018). In other instances, even when they announce the offering of relief packages, they do not follow through with their actions (Basha, 2018). Finally, the farmers' ability to optimise from their produce has been affected by the government's export and import policies related to the World Trade Organization and the General Agreement on Tariffs and Trade. These trade negotiations have often undermined the interests of the small and marginal farmers (Basha, 2018; Tantri & Deshpande, 2010).

One of the key factors that have undermined farmers in Karnataka is the sheer number of small and marginal farmers in the state: out of the total number of agriculture workers in the state, there are approximately 80 lakh small and marginal farmers in the state who own landholdings of less than 2 hectares (5 acres) (Aiyappa, 2019). These small landholdings, a result of land fragmentation, makes it difficult not only for machinery to work, but also to generate sufficient employment and income for the sustenance of these farmers and their families. Thus, it is little wonder that out of the 1,490 farmer suicides that took place in Karnataka from 1st July, 2015 to 30th June, 2016, 80 percent were committed by marginal and small farmers (Manjunatha & Ramappa, 2017).

At the same time, there is a higher number of farmer suicides reported from resource-rich and better-developed areas and districts such as Haveri, Mandya, and Mysuru than other drought-prone districts (Manjunatha & Ramappa, 2017). This can be attributed to the ability of the latter group of farmers to cope with unfavourable weather conditions by exploring a variety of other alternatives during dry spells (Manjunatha & Ramappa, 2017). In contrast, farmers from the aforementioned well-developed districts are less capable of exploring alternatives. Their situation has also been further affected by their cultivation of paddy that is difficult to sustain in the times of a water crisis (Manjunatha & Ramappa, 2017).

Punjab

The case study of Punjab is a representation of the issue of under-reporting of farmer suicides to the NCRB. According to the figure, Punjab experienced an increase in farmer suicides as a percentage of total suicides in the state from 7% in 2001 to 10% in 2011, and recorded a significant drop to about 0.5% in 2016. However, a survey conducted by Punjabi University, covering seven districts of the state actually indicated that the 1309 cases of farmer suicides recorded between April 2010 and December 2016 exceeded the 365 cases of farm suicide during 2000-2011 period, i.e., three times the amount (as cited in Vasudeva, 2017). As this survey only covers one-third of Punjab's 22 districts and do not even include Bathinda, Mansa, and Sangrur, as they fell under the purview of two other universities' research work, as part of an overall survey commissioned by the former government in 2015, it is evident that even this figure would not have adequately captured the dire situation faced by the farmers (Vasudeva, 2017).

A major contributing factor to farmer suicide in Punjab is debt. The majority of the farmers who committed suicide in Punjab were mostly marginal and small farmers with landholdings up to 5 acres who had taken additional land on lease at the rate of Rs. 40,000-50,000 per acre — a widely adopted practice in the Malwa region of Punjab (Grover et al., 2016). These lease land rentals are particularly high in the Malwa region, as the number of landless and marginal farmers are higher than the availability of farmland (Chaba, 2019). Moreover, these farmers do not have alternative employment opportunities in the region other than cultivation, which makes them all the more dependent on big landlords and *sahukars* (private money lenders) (Chaba, 2019). Whenever their crops failed, due to vagaries of the weather and pests/diseases such as the attack of white fly on the cotton crop for the cotton growers, their circumstances become further complicated by high rates of loans, as well as the high costs of agricultural machinery and other inputs/raw materials (Grover et al., 2016).

In contrast, regions of Majha and Doaba have been reporting lesser suicide cases than the Malwa region over the years. This is because most of the farmlands in these regions belong to Non-Resident Indians, or families that have members in government jobs or armed forces. As these individuals have already secured a regular income for themselves, they tend to lease out their lands at rates that are 20-30% lower than the other regions, thus reducing the pressure on farmers (Chaba, 2019). However, even though these regions have reported fewer cases, they could also be associated with under-reporting — a problem prevalent in the whole of Punjab. In regions such as Malwa, the employment of modern machines has also led to the surplus of manpower, with agricultural labourers finding it more difficult to keep themselves gainfully employed. As a result, Punjab's agricultural community is also plagued by

incidences of alcoholism, drug addiction, smuggling, and unemployment, which can also lead to farmer suicides (Grover et al., 2016).

Tamil Nadu

On paper, based on Figure 1, the farmer suicides as a percentage of total suicides in the state, was positive declining steadily from 8.5% in 2001, followed by 4% in 2001, and just slightly above 2% in 2016. Nonetheless, according to the Federation of Farmers Associations-Cauvery Delta districts General Secretary, Arupathy P. Kalyanam, the data were unreliable: “The data on deaths was compiled by the district collectors... Whichever party comes to power tries to suppress the data, instead of finding solutions to the root cause of the problem” (as qtd. in Mariappan, 2018, par. 3).

The farmers’ suicide rate in the distressed districts of Naga Patinam, Thiruvarur, Thanjbur, Pudi Kottai, and Tirunel Valley is relatively high (Sivagnanam, 2017). The districts form the central part of Tamil Nadu. Generally, farmer suicides are higher in those districts which concentrate more on cultivation of food and commercial crops (Sivagnanam, 2017).

Common reasons for farmer suicides, of which the majority involve small and marginal farmers, relate to bankruptcy and debt (Sivagnanam, 2017). These farmers are not able to obtain loans from cooperative or commercial banks due to their inability to provide collateral security, thus forcing them to borrow money from private parties /money lenders at higher rates of interest (Sivagnanam, 2017). According to investigators, the farmers’ need to obtain loans is primarily aggravated by the high costs of cultivation, technology, seeds, pesticides, and fertilisers (Sivagnanam, 2017). As highlighted by Qazi (2017), these farmers are counting on the fact that their investments could yield the bumper crops that could ensure their survival for the season.

Unfortunately, the vagaries of the weather and the lack of an adequate irrigation system in the state has severely undermined the farmers’ inability to stay financially afloat and repay crop loans. The ratio of area under irrigation in districts such as Thanjavur, Thiruvarur, and Nagapattinam is very low (Sivagnanam, 2017). All the farmers in the Cauvery delta region critically depend on its river water and canal irrigation (Sivagnanam, 2017). When there is insufficient rainfall that occurs from time to time, the farmers are pushed into a dire situation (Sivagnanam, 2017).

For example, in 2016, when Tamil Nadu was hit by a severe drought, the respective deficits in the rainfall of 62% and 20% during the northeast monsoon and the southwest monsoon plunged farmers into a desperate situation (Mariappan, 2018). The delayed opening of the Mettur Dam that could have stored much-needed water by four months did not help matters (Mariappan, 2018).

The three main reasons contributing to farmer suicides in Tamil Nadu are inadequate irrigation facilities, acute shortage of electric pump- set connections and inadequate supply of institutional credit. Accidental crop fires and salinity of soil are also said to be contributing factors. Under states of despair and depression, the farmers, as with their counterparts in Punjab, engage in widespread alcoholism, drugs, gambling, and betting, which further adds to their financial distress.

Chhattisgarh

As described earlier in the results, Chhattisgarh was one of the few states that showed a promising trend of a significant decline in the proportion of farmer suicides. Unfortunately, non-NCRB sources suggest that this positive trend may not reflect the actuality.

More recent research by Niranjana et al. (2020) illuminates the continued prevalence of the farmer suicides. Although the authors concluded that suicides were more socially-related than farming-related — family problems, drug abuse, illness, alcohol addiction, fall in social reputation, extra-marital affairs, and quarrels between victims and others, it did point to indebtedness as a major concern. The identification of the common problem of indebtedness, as experienced by farmers across all the Indian states addressed in the mini state analyses, suggests that the fundamental root cause of the social problems leading to farmer suicides is still essentially farming-related. This is despite Chhattisgarh's Agriculture Minister Brijomohan Agrawal's declaration in June 2018:

Chhattisgarh is the first state to buy paddy from the farmers at the support price... gives a bonus of Rs. 300 (to farmers for paddy cultivation) ... loans to farmers at zero percent interest rate... Rs. 1 lakh to farmers for their pumps, transmission line... No other government is perhaps doing as much as this government is doing for the farmers, so it is totally wrong to say that farmers here are committing suicide due to farm-related issues. (“Suicides Happen in Developed Cities”, 2018)

However, in reality, much discontent was engendered in 2018, as the government's purchase price for food grains would turn out to be inadequate and crop insurance schemes were inefficient under the *Pradhan Mantri Fasal Bima Yojana* or PMFBY (Prime Minister's Farm Insurance Scheme), while the bonus payments of Rs. 300 per quintal were mired in delays (Paliath, 2018).

Therefore, the positive trend of the declining farmer suicide rate could actually have been attributed to the underreporting of the numbers of farmer suicides, as proposed by Sainath (2015). Chhattisgarh reported "nil" or extremely few cases of farmer suicides three years in a row since 2011: it announced 0, 4 and 0 farmer suicides (Sainath, 2014). The average of farmer suicides in the state right before this period, in the preceding years was 1,567 which illuminates the gravity and the persistence of the problem of under-reporting (Sainath, 2014).

This discrepancy with the official NCRB data further reaffirms the institutional and systemic reason for the prevalence of suicides. In fact, the NCRB had been unable to gather data on farmer suicides 2017 onwards successfully due to a disastrous 10-month merger with the Bureau of Police Research and Development (BPRD) ("Govt puts on hold plan to merge police bodies NCRB, BPRD", 2018). Several state governments, including that of Chhattisgarh, which had taken over the report of farmer suicides data have no incentive to report the actual rates of farmer suicides in order to minimise compensation (Sainath, 2015). Government sources have sought to claim that the states' suicides were not related to farming-related issues (Sainath, 2015). Thus, it is evident that the state governments need to do far more in tackling the root causes of the distressing phenomenon of farmer suicides in the state of Chhattisgarh.

Conclusion

The discussion has shown that both the states and the years have a statistically significant effect on farmer suicides as percentage shares of their corresponding states' total suicides. Despite the fact that the data show an overall decline in the percentage shares of farmer suicides across the years, it was important to take a closer look at the situation at the state level. In fact, the 2-way ANOVA Without Replication highlights the greater influence of the state in accounting for the variance of the percentage of the farmer suicide than the year. Examining at the percentage of the farmer suicides rates by state, one can see even though there are some promising trends in the suicide rates in the states of Chhattisgarh, Kerala, and Uttar Pradesh, other states such as Maharashtra, Andhra Pradesh and Madhya

Pradesh, Karnataka, and Tripura are still experiencing significantly high, if not, increased rates in 2016 compared to 2001 and 2011.

The mini case studies of five Indian states — Maharashtra, Punjab, and Tamil Nadu, Karnataka, and Chhattisgarh — to identify the underlying causes of farmer suicides actually show a common pattern afflicting farmers across the different states. For all of them, the primary pressure that leads to farmer suicides is their crushing debt and inability to repay the loans. This is often a result of a convergence of multiple critical factors that include:

- Extreme and erratic weather conditions;
- Absence of the basic infrastructure like irrigation, storage facilities, dams, and rural roads, as well as a low level of electrification in the rural areas; and
- Lack of or failure to implement adequate institutional support in the form: MSPs, loan interest rate regulations, farmer subsidies to support their economic well-being and agricultural modernisation efforts.

Based on the factors highlighted above, the following recommendations, some of which have been formulated by various state governments such as Maharashtra, Punjab and Tamil Nadu, are put forth in an endeavour to provide a comprehensive set of remedies to eradicate this age-old problem once and for all:

- **Ensuring reasonable loans to farmers:** State governments should pass laws to: 1) impose a cap on interest rates for farm loans in order to curb excessive high rates of private lenders; 2) incentivise large financial institutions to offer loans to private farmers by putting up security collateral in a comprehensive package; and 3) ensure that farmers are able to access platforms for them to seek assistance should they incur crushing debts, especially due to circumstances beyond their control.
- **Building up infrastructure in the agricultural sector:** Given the increasingly erratic nature of the weather, the state governments need to bolster the irrigation systems in order to ensure sufficient weather supply and decrease the susceptibility of crops to droughts. Similarly, drainage systems need to be installed in order to drain away excessive water during the monsoons. Other infrastructural aspects that could be constructed and enhanced include rural roads and power supplies. The construction of such fundamental infrastructure could also be providing additional work for agricultural labourers.

- **Investing in the modernisation of the agricultural sector:** State governments should be subsidising farmers, whether individually or through village self-help groups, to obtain the necessary machinery and pest-resistant seeds so that farmers can increase the yield of their crop without having to incur financially debilitating loans.
- **Institution of a safety net for farmers:** To ensure the well-being and livelihoods of farmers, state governments should be prepared to implement a slew of protective measures such as MSPs, minimum income plans, crop insurance subsidies, in order to offset the occurrences of any unexpected circumstances.
- **Creation of crop and health insurance schemes:** Efforts should also be made so that crop insurance schemes reach each individual farmer and health insurance is made mandatory with government support for the farming community (Niranjan et al., 2020).
- **Promotion of crop/variety diversification:** A campaign should be launched for crop/variety diversification in various agro-climatic regions such as Chhattisgarh (Niranjan et al., 2020).

Ultimately, there is no denying that the farmer suicides crisis has gone on for far too long in India. Instead of turning its back on the agricultural sector, India should be tapping into its growing wealth and reservoir of knowledge to optimise the untapped potential of its agricultural sector. Rather than spending vast sums of money to import food to keep up with the rising food demand (Bajaj, 2011), India could be enlisting the assistance of agricultural experts who can work together with farmers to develop an approach that “combines the best of both high-tech and environmentally sound agricultural practices”, as well as crop rotation that can prevent the natural dominance of pests (Qazi, 2017, par. 11). What India should understand is that in saving the lives of its farmers, it will also be cultivating the path to its long-term food sustenance, which will become increasingly in the long term.

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Appendix

Farmer Suicides as Percentage of Total Suicides in Corresponding States

State	2001	2011	2016
Maharashtra	24.2	20.9	21.3
Andhra Pradesh	14.3	14.6	13.3
Karnataka	21.1	16.6	19.6
Chhattisgarh	36.1	18.8	10.2
Madhya Pradesh	20	14.3	12.7
Kerala	10.8	9.8	4.2
West Bengal	9.1	4.9	0
Uttar Pradesh	18.5	13	5.2
Tamil Nadu	8.7	3.9	2.5
Gujarat	12.4	9.1	5.2
Haryana	7.2	11.8	6.8
Assam	6.3	11.4	0.02
Rajasthan	15.8	6.2	1.2
Bihar	10.3	8.8	0
Odisha	6.3	2.7	3.1
Punjab	6.9	10.1	0.34
Puducherry	17.2	9.4	0
Himachal Pradesh	7.2	10.4	2.2
Tripura	4.8	2.8	3.2
Jammu and Kashmir	9.8	4.9	6.4
Goa	7	0.3	0.04