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The Impact of Policy on Farmer Suicide in India: A Scoping Review

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ABSTRACT

High suicide rates are reported among farmers in India; 400,000 died by suicide between 1995 and 2018. This has resulted in governmental policy-level interventions, however, their effectiveness is unclear. This study explores existing research on policies' impacts on farmer suicide in India. Using scoping review, we searched literature from 2000 through 2023 for empirically-based articles on policy and farmer suicide in India. We found 17 articles, five of which examined the impact of governmental policies and 12 that examined the impact of policy-modifiable factors on farmer suicide. Policy providing farmers with credit and government spending on flood control and agricultural infrastructure were associated with lower farmer suicide. Most frequently identified policy-modifiable factors were debt, poverty, water and irrigation, small farm size, low wages, cash crops, and illiteracy. While many policies have been established to address farmer suicide in India little research exists to demonstrate their effectiveness. Additional research is needed.

Keywords: farmer suicide, farmer suicide in India, Indian agricultural policy, suicide reduction policy.

INTRODUCTION

Over the past few decades, India, an agrarian nation, has witnessed a disturbing increase in farmer suicides. Agriculture forms the backbone of the Indian economy, employing approximately 44% of the workforce [1]. Despite its critical role, the agricultural sector faces numerous challenges, including inadequate infrastructure, fragmented landholdings, unpredictable weather conditions, and volatile market prices. These challenges have led many farmers into financial distress, with some cases tragically resulting in suicide [2]. This crisis has resulted in calls for action and governmental policy-level interventions have been developed. However, it is difficult to sort opinion and anecdote from fact and thus is unclear what impact policies have had on farmer suicides in India and what policies are promising targets for future change. The purpose of this study is to examine the existing research on the association of governmental policies and policy-related issues with the rates of farmer suicide in India. Using a scoping review, our aim is to explore the empirical research findings that examine the impact of policy, or lack of needed policy, on farmer suicide, and make recommendations for future policy changes and additional research.

Farmer Suicide in India

As far back as the 1990s, the phenomenon of farmer suicide has been observed with alarm in India, with 400,000 farmers having died by suicide between 1995 and 2018, translating to approximately 48 suicides every day [3]. As of 2001, the overall suicide rate for farmers across India was 15.8/100,000 people, 50% higher than the general population rate [4]. In 2006 a downward trend in these numbers began, however the numbers have climbed steadily again since 2019. According to the National Crime Records Bureau (NCRB), 5,563 farmers committed suicide in 2021, marking a 9% increase from 2020 and a 29% rise from 2019 [5]. More recent data indicates that in 2022, 11,290 farmers took their own lives, continuing the upward trend [6].

Comparing the farmer suicide data from India with other countries reveals a global pattern of elevated suicide rates. In the U.S., farmers and agricultural workers have a suicide rate higher than the general population. A 2020 study found that the suicide rate among male farmers and ranchers was 43.2 per 100,000, compared to 27.4 per 100,000 for the general working-age population (Peterson et al., 2020). Australia has also faced high rates of farmer suicides. A study covering 1988-1997 found that male farmers had a suicide rate 1.29 times higher than employed rural men [7]. In France, a 2013 study reported that farmers had a 20% higher risk of suicide compared to the general population [8]. Australia has also reported higher suicide rates among farmers than among the general public]9].

The issue of farmer suicides in India is complex and multifaceted. The crisis is not evenly distributed across India, with states such as Maharashtra, Karnataka, Telangana, Chhattisgarh, and Andhra Pradesh consistently reporting the highest numbers of farmer suicides [5]. In 20212, Maharashtra reported 4,248 suicides, followed by Karnataka (2392) and Andhra Pradesh (917) [10]. These states are also those with among the highest numbers of agricultural producers, due to vast differences in weather, geography, and arable land.

Several key factors have been identified as contributing to this crisis, though it should be noted that the last systematic review on this topic was published in 2016 [4]. These factors include:

- Indebtedness: Multiple studies have identified debt as a predominant factor associated with farmer suicides [2-6]. Many farmers borrow money to purchase seeds, fertilizers, and other essential farming inputs, leading to a cycle of debt when crops fail. In addition, farmers may not have access to bank and government loans, forcing them to turn to private moneylenders, with higher interest rates and more aggressive collection strategies.
- Economic distress: Deterioration in economic status, rising input costs, and low produce prices, resulting in low income and poverty, have been cited as significant contributors [5, 10].
- Climate change and environmental factors: Unpredictable weather patterns, droughts, and floods have led to crop failures and increased financial pressure on farmers [3, 6]. A study by the International Institute for Environment and Development (IIED) found a direct correlation between rainfall deviations and increased farmer suicides [6].
- Crop-specific issues: The cultivation of cash crops, particularly cotton, has been associated with increased risk of suicide [3,10].

- Lack of alternative income sources: The absence of secondary income opportunities has left farmers vulnerable to crop failures [3].
- Social and personal factors: Issues such as alcohol addiction and family responsibilities have also been identified as playing a role in farmer suicide [3].
- Marginalization: Research has also highlighted that many farmers who die by suicide belong to marginalized communities, including Dalit and other lower status castes [3].

Policies in India and Farmer Suicide

In response to this crisis, the Indian government has implemented various policies and programs over the years. These include debt relief measures, financial assistance packages, and initiatives aimed at enhancing agricultural sustainability and productivity [11]. Notable policy interventions are summarized in Table 1 below [12-14].

Table 1: Notable Policy Interventions in Response to Farmer Suicide in India

Policy	Year	Description
Kisan Credit Card (KCC) Scheme	1998	Provide adequate and timely credit to farmers for agricultural operations. The government made credit readily available at a very subsidized rate of 4%.
National Agricultural Insurance Scheme (NAIS)	1999	Provide insurance coverage and financial support to farmers in the event of crop failure due to natural calamities, pests, and diseases. Its goal was to protect farmers from financial losses due to crop failure, encouraging them to adopt progressive farming practices and newer technologies.
Government Relief Package	2006	Target districts with high farmer suicide rates, provided debt relief to farmers, improved supply of institutional credit, improved irrigation facilities, employed experts and social service personnel to provide farming support services, and introduced subsidiary income opportunities through horticulture, livestock, dairying and fisheries.
Agricultural Debt Waiver and Debt Relief Scheme	2008	Address issue of farmer indebtedness and provided for the waiver of all agricultural loans disbursed by scheduled commercial banks, regional rural banks, and cooperative credit institutions up to March 31, 2007, and overdue as of December 31, 2007.
Maharashtra Bill to Regulate Farmer Loan Terms	2008	Regulate all private money lending to farmers, setting maximum legally allowed interest rates, setting slightly above the rate by the Reserve Bank of India
Maharashtra Assistance Program	2010	Ban unlicensed moneylenders from demanding loan repayment, introduce low-cost crop insurance, and other income sources like poultry, dairy, and sericulture. Allocat $10 million per district annually for community wedding celebrations under Samudaik Lagna.
Kerala Farmers' Debt Relief Commission	2012	Extend benefits to all distressed farmers with loans through 2011.
Package to Diversify Income Sources	2013	Introduce the Special Livestock Sector and Fisheries Package for farmers in Andhra Pradesh, Maharashtra, Karnataka, and Kerala to diversify income sources.

PM Krishi Sinchai Yojana (PMKSY)	2015	Enhance physical access of water on farm and expand cultivable area under assured irrigation, improve on-farm water use efficiency, introduce sustainable water conservation practices
Per Drop More Crop (PDMC)	2015	Increase water use efficiency at the farm level through Micro Irrigation technologies and financial assistance for irrigation
Pradhan Mantri Fasal Bima Yojana (PMFBY)	2016	PMFBY replaced the NAIS and modified NAIS. Provide comprehensive crop insurance coverage from pre-sowing to post-harvest losses against non-preventable natural risks.
Vasabtrao Naik Sheti Swavlamban Mission of Maharashtra	2016	Provide new crop loans to farmers and other measures to promote the welfare of farmer finance, food, health, and education, specifically for suicide prevention
Rashtriya Krishi Vikas Yojana - Remunerative Approaches for Agriculture & Allied Sector Rejuvenation (RKVY-RAFTAAR).	2017	Provide support to states for creation of pre and post harvest infrastructure in agriculture
Pradhan Mantri Kisan Samman Nidhi (PM-KISAN) scheme	2019	Provide income support to all landholding farmers' families in the country. Eligible farmers receive up to ₹6,000 per year as minimum income support. The amount is paid in three equal installments of ₹2,000 each, directly into the bank accounts of the beneficiaries
Pradhan Mantri Kisan MaanDhan Yojana (PM-KMY)	2019	Provide security to most vulnerable family farmers. Farmers contribute a monthly amount to the Pension Fund, matched by the central government.
Formation and Promotion of 10,000 Farmer Producer Organizations (FPOs)	2020	Provide financial and professional support to farmer producer organizations for 5 years.

Despite the many policy changes seen to address farmer suicide in India, the effectiveness of these interventions remains a subject of debate, with some arguing that a more comprehensive approach is necessary to address the root causes of the issue, rather than relief and post-hoc responses. Many farmers report receiving inadequate support from these policies and programs, and the suicides continue.

Goal of this Research

Rigorous examination of the impact and potential impact of policy on farmer suicide rates in India is needed. To begin this exploration, a comprehensive picture of existing research findings is necessary. This research study therefore engaged in a scoping review of the literature, examining all empirical studies that looked at policies, or issues that could be addressed by policies, impacting farmer suicides in India from January 2000 to December 2023. Policies were defined as legislation, regulation, or programs at the national or state levels.

All identified peer-reviewed articles examining this topic were summarized and synthesized, and implications for both policy and future research are discussed.

METHODS

Article Search and Selection

A great deal has been written about farmer suicide in India, but much of it is grounded in opinion or anecdote. Thus, in order to answer the research question, the researchers determined to examine empirical studies with a that had withstood rigorous peer review For selection in this scoping review articles were chosen if they met the following criteria: 1) they were published between 2000 (since the 21st century has seen a rise in frequency of the problem of farmer suicide in India) and December 31, 2023; 2) they were data-based research, either primary or secondary data analysis; 3) they were published in a peer-reviewed journal; 4) their focus was specifically on suicide among farmers; 5) their focus was specifically on the country of India; and 6) they examined the impact of a governmental policy or regulation, or an issue that could be regulated by government policy, on farmer suicide in India. A scoping review strategy was used in order to provide a broad picture of the landscape of research on this topic [15].

The search for this study used this strategy: (suicide AND India AND (farmer* OR agricultural) AND (law OR polic*)) in either title or abstract. Articles were limited to the time period of January 2000 through December 2023. The databases selected were broad-based, to cast a wide net; they were EBSCO, Google Scholar, and PubMed. An initial list was created and duplicate listings removed. The titles of remaining articles were screened by two researchers independently to determine whether they met selection criteria; any disagreement was discussed by researchers to consensus. Remaining articles were reviewed in full by two researchers independently to determine whether they met selection criteria; again, any disagreement was discussed by researchers to consensus.

Data Collection and Synthesis

A data extraction form was developed by the researchers to capture the following for each article; 1) data source; 2) analytic method; 3) geographic location of study (national or specific to a region); 4) results of relevance to the research question regarding the impact of policy on farmer suicide in India. Data extraction was completed for each article by one researcher, and reviewed by a second researcher.

Once data were extracted, researchers worked together to identify common themes and policy issues across articles. Articles were clustered based on these themes and findings synthesized. Results and discussion were organized by these themes.

RESULTS

Selection of Articles

The initial search of the literature recovered 656 records. Duplicate records (n=361) were removed and each researcher screened the remaining records (n=295), examining titles to determine whether they met criteria for selection. Upon excluding those that did not meet criteria in this screening (n=164), the remaining 131 articles were retrieved and reviewed in full. From this, 114 articles were excluded and 17 studies were included in the review. The PRISMA [16] flowchart is seen in Figure 1 below.

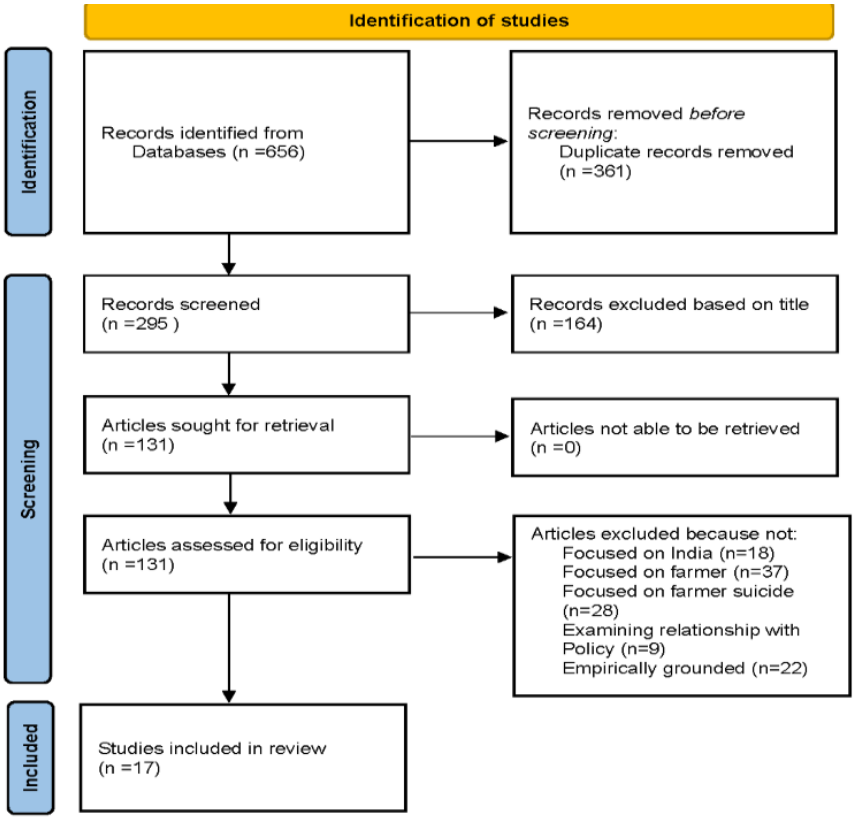

Figure 1: Prisma flow diagram of search strategy [16]

Characteristics of Individual Studies

The characteristics of the final 17 studies included in the scoping review are summarized in Table 2. Five of the articles examined data at the national level, two articles examined state-level outcomes for all states in India, two examined multiple states, and the remaining eight focused on specific states within the country. States examined were Maharashtra (five studies), and one study each for Karnataka, Punjab, Telangana, and Andhra Pradesh States. Eight of the studies engaged in primary data collection. In six cases, data were collected by structured interview of households where a farmer had died by suicide (four with interviews of matched controls), one study gathered data using focus groups of farmers and another with structured interviews of farmers.

An additional eight studies engaged in secondary data analysis using various national databases. One study used mixed methods, with state-level secondary data as well as interviews with families who had lost a farmer to suicide and matched controls.

When examining the studies' level of policy analysis, researchers found that five articles examined governmental policy(ies) (e.g. government spending on flood control) and their specific impact on farmer suicide rates. The remaining 12 articles examined the impact of specific factors that could be modified by policy (e.g. access to irrigation) on farmer suicide rates.

Table 2: Summary of Identified Studies

Author	Geographic Location	Data Source(s)	Methods	Policy-Relevant Findings
Bhise, M.C. & Behere, P.B. [17]	Maharashtra	Interviews of matched households with and without a farmer suicide. All cases in time period for one District. N=196	Semi-structured interviews, multivariate logistic regression	Debt in past five years significant risk factor for farmer suicide.
Dongre. A. & Deshmukh, P. [18]	Maharashtra	Representatives from farmer self-help groups, one member per group. N=10	Focus group with free list, pile sorting, and semi-structured discussion	Debt, poor crop prices, government apathy, poor irrigation, increased farming costs, private money lenders were policy-relevant reasons for farmer suicide. Government relief packages not accessible locally to poor farmers.
Gedela, S. [19]	Andhra Pradesh	Structured interviews of matched households with and without a farmer suicide. Selected from villages with highest suicide rates. N=74	Structured interviews, multivariate logistic regression	Value of livestock and produce, outstanding debt per hectare, literacy levels statistically significant in predicting suicide.
Gruere, G. & Sengupta, D. [20]	National	Data from IndiaStat, National Crime Records Bureau (NCRB), Cotton Advisory Board	Secondary data used for descriptive and correlational statistics of Bt cotton impact on yield, Bt cotton adoption and farmer suicides	No observed correlation between national or regional Bt cotton adoption rate and farmer suicides, though cannot dismiss possibility that Bt cotton played a role in farmer suicide increases for certain states and certain years.
Jabeen, U. [21]	Telangana	Data collected from households of farmers who died by suicide. Multi-stage random sampling. N=25	Survey data used for descriptive analysis of farmer characteristics	Farmers dying by suicide had <10 hectares of land, most unable to meet expenses, owed money to moneylenders and nearly half of moneylenders forced repayment. All had irrigation problems, half had crops fail
Kale, N.M. [22]	Maharashtra	Interview of 40 households of farmers who died by suicide and matched controls.	Comparative reports on multiple variables from structured	Farmers who died by suicide had lower crop production, lower average income, more were in debt, fewer used formal lending sources, more had a gap between

		Proportionate random sampling. N=80	interviews, no statistical analyses	earnings and expenses than controls
Kale, N.M. & Vidyapeeth, P. [23]	Maharashtra	Household interview where farmers suicide. Proportionate random sampling. N=200	Descriptive statistics of data from structured interviews	Majority had subsidiary income from farm labor with no income outside of farming
Kale, N.M. [24]	Maharashtra	Interview with household of farmers who died by suicide. Proportionate random sampling. N=200	Descriptive statistics of data from structured interviews.	Majority were marginal/small farmers (<2 hectares), of very low SES, had no access to irrigation, indebted and had non-institutional loans
Kaur, L., Garg, L. & Sharma, P. [25]	Punjab	Interview of farmers in Punjab. Multi-stage random sampling. N=200	Descriptive statistics and measures of central tendency for data from structured interviews	Participants identified debt, input costs, crop failure, dependence on money lenders as reasons for suicide. Majority felt government policies needed to address the issue
Kennedy, J. & King, L. [26]	National	Secondary data from Ministry of Agriculture, NCRB, Registrar General of India, national Sample Survey Organization	Used various combinations of data for descriptive statistics, correlation, scatter plots, and linear regression	Farmers who cultivated cash crops, had marginal landholdings, and were in debt were at higher risk for suicide.
Menezes, G. [27]	National	Secondary data from NCRC	Descriptive statistics	Most common causes of farmer suicide were indebtedness, farming failures, family problems.
Nagthan, S., Poddar, R., Kunnal, L., Basvaraja, H., Banakar, B. et al [28]	Karnataka	Secondary data from Joint Director of Agriculture for the State, primary data obtained from families of selected farmer suicide cases and controls.	Descriptive statistics and logistic regression from structured interviews	Farmers dying by suicide more likely to be illiterate; predictors for suicide include debt, age, occupation (farm only), education, landholdings and net income
Parida, Y., Dash, D., Bhardwaj, P.& Chowdhury, J. [29]	17 States	Secondary data from NCBR and other governmental sources	Descriptive statistics, negative binomial regression, fixed effect Poisson model	Higher rates of farmer suicides associated with drought-prone states, lower agricultural wages, lower government spending on flood control, high cotton production, and lower levels of literacy. Interaction of poverty and

				drought and cotton production and drought also significant
Patnayak, R. [30]	National	Secondary data from NCRB and other government sources	Descriptive statistics and linear regression	Farmer suicide rates declined significantly with increased rainfall, increased irrigation, increased # KCC cards issued.
Reddy, A., Raju, S., Bose, A. [31]	State-level data for the nation	Secondary data from National Sample Survey Office, National Bank for Agriculture and Rural Development	Descriptive statistics, correlation	Higher farmer suicides in states with higher rainfed (i.e. non-irrigated) areas, and with higher % farmers in debt
Sadanandan, A. [32]	State-level data for the nation	Indian Census, Handbook of Statistics on Indian Economy, Ministry of Agriculture, NCRB	Descriptive statistics, linear regression	As a state's deposits in foreign and private banks increased, the % of farmers able to secure bank loans decreased. % farmers using moneylenders, % farmers in debt increased. As irrigation levels rose, so did availability of bank loans. State's bank loans availability and number of KCC distributed negatively associated with farmer suicide rates. General government spending not significant.
Singh, R. [33]	28 states	NCRB, Handbook of Statistics on Indian States, National Sample Survey Office	Descriptive statistics, linear regression	Proportion of irrigated land, average yield per hectare, and available credit negatively associated with farmer suicide.

Research Summary

Of the 17 articles identified in this scoping review, five identified the impact of specific government policy(ies) on rates of farmer suicide in India. All 17 empirically identified predictive factors that were or could be targets of government policy and that were associated with higher rates of farmer suicide.

Factors Associated with Farmer Suicide

Debt:

The most frequently identified factor associated with farmer suicide in these studies involved debt and lack of access to credit from a trustworthy source. In 12 articles [19, 21-22, 24-28, 30-33] researchers were able to demonstrate that farmers with high debt or who could not access credit were more likely to die by suicide. In six articles [18, 21, 22, 24, 25, 32] it was specifically noted that debt to a private moneylender, rather than a bank, was associated with higher farmer suicide rates. Money borrowed from a private moneylender must usually be paid back with a much higher interest rate, increasing the stress experienced by farmers.

Insufficient Income:

Farmers often go into debt because their farm generates insufficient income to support themselves and their families and cover the costs of farming. In eight studies it was found that generating insufficient income from the farm was associated with higher rates of farmer suicide. They found than increased farming costs [18, 25], decreased prices received for crops and livestock [18, 19], and failed or poor crops [21, 22, 25, 27] were associated with farmer suicide. Long time periods with lack of success in farming could result in chronic poverty and low socio-economic status; this chronic poverty was also found to be associated with increased farmer suicide [22, 24, 28].

Water:

In farming, an adequate and reliable water supply is essential for success. Seven articles specifically identified issues with water as a factor associated with higher rates of farmer suicide. They found that farmers who died by suicide were more like to have no access to or poor irrigation [18, 21, 24,30] or live in areas with higher non-irrigated land [31, 33] In addition, two researchers noted that rain played an important role as a farmer suicide stressor. Patnayak [30] reported lower farmer suicide rates in areas with higher rainfall, while Parida and colleagues [29] noted higher suicide rates in drought-prone areas. They also found that areas with lower government spending on flood control had higher rates of farmer suicide.

Farm Size:

Small, subsistence, and tenant farmers have the greatest difficulty eking out a living through farming in India, and the stresses of this struggle were shown to be associated with higher farmer suicide rates in four studies. In one case, having a farm of less than ten hectares was associated with higher suicide rates [21], in a second it was less than two hectares [24] and in two other studies [26, 28] “marginal” farm size was associated with higher suicide rates.

Work Outside of Farming:

When farming does not generate enough income to support a family, farmers may often try to find subsidiary income [23]. Two studies found that in when farmers’ subsidiary income is still within farming (e.g. working as a farm laborer in another person’s farm) the risk of suicide is higher [23, 28]. This could in part be explained by low wages paid to agricultural workers, leaving the farmer in a financial deficit even if working additional hours. Parida et al. [29] found that farmer suicide rates were higher in areas where agricultural wages were lower.

Crops Cultivated:

In three studies, researchers examined the association between particular crops grown and risk of farmer suicide. There has been a great debate in India about the value and impact of genetically modified cotton—Bt cotton. Despite much higher yields, because of its increased seed costs and lack of understanding in how to plant and fertilize Bt cotton, there have been claims that Bt Cotton is associated with higher farmer suicide rates [34]. One study [20] disputes this and using multiple secondary data sets found no correlation between national or regional Bt cotton adoption and farmer suicide rates. While the selection of Bt cotton for cultivation may not have a proven association with farmer suicide rates, two researchers have demonstrated that the cultivation of cash crops such as cotton, rather than subsistence crops to feed the farm family, is associated with farmer suicide. Kennedy & King [26] found that

farmers who cultivate cash crops are at greater risk of suicide, and Parida et al. [29] found higher rates of farmer suicide in regions with higher cotton production.

Literacy:

A final factor identified in multiple studies was farmer literacy. Both Geleda [19] and Nagthan and colleagues [28] found that farmers who died by suicide were more likely to be illiterate. Similarly, Parida et al. [29] found higher farmer suicide rates in regions with lower literacy rates.

Government Policy Associated with Farmer Suicide:

Five of the studies identified in this review specifically examined the impact of a government policy or set of policies on farmer suicide rates. As described above, Gruere & Sengupta [20] examined the impact of the government's approval of the use of genetically modified Bt cotton on farmer suicide rates and found no association at the national or regional levels. However, this research could not dismiss the possibility of an association in certain states or areas for specific years. Using state-level data from national sources, Parida et al. [29] examined factors predictive of higher rates of farmer suicide at the state level. In their analyses they examined the impact of government policies on flood control and overall government expenditures on agriculture and allied activities on farmer suicide. In their model, they found that having such policies and expenditures in place was statistically significant in predicting farmer suicide.

Two studies examined government policy providing access to credit as predictors of farmer suicide rates. The number of Kisan Credit Card (KCC) issued were predictive of farmer suicide rates within a state. Patnayak [30] found that, among other variables, KCC are a government program designed to provide adequate and timely credit to farmers at a government subsidized low rate, so that farmers have a simple and quick way to purchase supplies for their agricultural activities. Similarly, Sandanan [32] found that states where more KCCs were used saw lower rates of farmer suicide. In this study it was also noted that states where state credit was easier to come by and bank loans were more available to farmers had lower rates of farmer suicide. Unlike the findings in Parida et al. [29], however, general government spending on agricultural was not significantly associated with farmer suicide rates in this study. A final study [18] examined the operationalization of government policy, as experienced by actual farmers. Using qualitative methods farmers were asked about causes of farmer suicide. At the level of government policies, participants noted that while there were relief packages for farmers, there was nothing to promote farmer self-reliance and thus relief did not address the underlying problems of farmers, serving more as a "band aid" than solution. In addition, participants noted that while some relief packages distributed farm equipment to farmers, these were difficult for poor farmers to access, since it required frequent visits to district offices which are far away and expensive to travel to and that distribution of relief was often unfair and that funds were "siphoned off poor farmers' benefits by rich farmers" (p. 4).

DISCUSSION

The issue of farmer suicide has been a documented problem for well over 30 years [3]. It is clear that farmer suicide stems from a complex interaction of economic, environmental, social, and policy factors, necessitating systemic interventions. While much has been written on the topic

of farmer suicide, there has been little scholarship using a specifically policy lens. Given that changes to address this national problem require systemic governmental actions, an understanding of the policies that have been effective and the policies still needed to address the issue of farmer suicide is imperative. This study began an examination of the empirical findings related to policies to address farmer suicide through a scoping review, to better understand what has been discovered to date on this topic.

Overall, our scoping review found factors associated with farmer suicide in India that were similar to those found in prior reviews. Rather than psychological issues, our review found debt, lack of income and poverty, lack of bank credit and private moneylending, issues of water access and irrigation, farm size, opportunities for supplemental earning, crop cultivation, and literacy levels all significant predictors of farmer suicide in India. This echoes the work of Merriott [4], whose review found studies indicating that debt, cash crops (particularly cotton), lack of credit, neoliberal trade reforms, lack of non-agricultural subsidiary occupations, irrigation issues were factors in farmer suicide. However, unlike other reviews, we specifically looked for empirical evidence of the impact of governmental policies on farmer suicide rates. This could be through policies which resulted in increased farmer suicide rates, policies put into place to ameliorate farmer suicide rates, or areas where policies are needed but do not exist. We found very little research examining this important question.

This lack of research becomes more concerning when one considers three factors, discussed at the beginning of this article. First, as shown in Table 1, starting in the 1990s the government of India and some regional governments have implemented policies aimed at supporting farmers and decreasing suicide rates. These policies have included the provision of easier access to credit, crop insurance, debt relief, regulation of private moneylenders, better water management, and farmer informational supports. Second, in 2006, the farmer suicide rates began to decline, and have done so until 2019 [10]. Finally, since 2019 the rates of farmer suicide have again begun to increase [10]. However, without strong research examining the potential impact of governmental policies on farmer suicide rates, it is impossible to determine which, if any, government policies were effective in reducing suicide rates and thus which should be expanded or modified to address the increase seen since 2019. Policies, as shown in Table 1, aimed to address farmer debt, farmer poverty and lack of income, lack of access to credit at reasonable rates, problems with water access, and expansion to more profitable ways of farming. Yet, as has been shown in our review, despite policy changes these problems and associated farmer suicides continued. To address the issue of farmer suicide, it is crucial to understand which policies have had an impact on factors associated with farmer suicide, and how these policies could be more effective. Sadly, little research specifically looking at this exists.

Findings Regarding Existing Government Policies

From the research identified in this scoping review, we have found two main areas where governmental policies have been empirically shown to be associated with farmer suicide rates. First is government expenditure in agriculture, specifically in water management. Parida's work demonstrated that governmental water management and flooding policies were associated with lowered farmer suicide rates. Second, providing farmers with easily accessed

credit from government sources was associated with lower suicide rates. Both Patnayak and Sandanan found access to the KCC governmental credit associated with lower farmer suicide rates. In addition, Sandanan saw lower suicide rates in states where state credit and bank loans were more easily obtained in general.

In addition to policy content, one study suggested that policy operationalization had a meaningful impact on farmer suicide rates. In Dongre & Deshmukh's study [18] farmers reported that policies were often ineffective, because governmental relief could not be accessed by farmers due to distance or because funds were siphoned off by individuals not in need. In discussing governmental subsidies to farmers, Arora [35] notes "While the intention of the Government offering subsidy on seeds, fertilizers, irrigation is not questioned, its implementation remains faulty, and the middlemen involved in it usurp a major part of the subsidy amount." In addition to critique of implementation, government policy has been criticized for its band aid approach, offering debt relief to farmers after they have gone deep into debt rather than helping farmers building resilient farm businesses. [27].

Policy Recommendations

Given the research findings outlined above, what policy actions can be recommended to decrease farmer suicide in India? it is clear that straightforward assistance in accessing credit through KCC is an impactful policy and should be expanded. Similarly, policies making bank loans more easily obtained in general and curtailing exploitation by private creditors and moneylenders should be expanded, and the efficacy of existing policies in this area enhanced. The same is true of governmental water management policies, where expansion of policies for flood management and irrigation are needed. These should be considered and tailored at the state level given the wide range in weather and water availability seen across India.

In addition, though little to no empirical evidence exists as to the effectiveness of policy changes in these areas, other stressors associated with farmer suicide could be addressed through policy at the national or state levels. In some cases, policies have attempted to address them, but without empirical evidence of effectiveness. The following issues require amelioration through policies that are then evaluated and continued if they are shown to have demonstrated effectiveness.

- Ensuring that farmers have a minimally sustainable income, even in years where the farm is not successful, could be addressed by the establishment of income supplement policies and through crop insurance.
- Given the risk of farmer suicide is highest in small and marginal farms where farm success is less likely, policies that promote voluntary farming cooperatives and shared risk could be of utility
- Specific farmer education programs are needed so that farmers can learn how to use GMO seeds like Bt cotton in ways that are effective and not excessively costly, and learn how to select a range of crops that will provide both cash and family sustenance
- Community development and farmer education programs are needed so that farmers can engage in work outside of farming for supplemental income, ensuring that in lean farming years farmers will have other opportunities to generate income

- Since farmer education and literacy in general have been shown to be associated with higher suicide rates, policies to develop farmer literacy programs may be helpful. Literacy may allow farmers to better understand contracts, instructions on farming inputs, and farming educational information

Developing policy content to address factors associated with farmer suicide in India is crucial, but not sufficient. As suggested by the work of Dongre & Deshmukh [18], implementation significantly influences the potential impact of policies. Ensuring that material support provided through policies is actually received by farmers most in need and not siphoned off by others in the distribution chain or who are less needy is essential for policy impact. So too is ensuring that supports are accessible to all farmers, even those in remote areas. Only strong policies that are operationalized effectively can have an impact on farmer suicide.

Future Research

This scoping review has shown that farmer suicide rates in India are concerning and have not been fully addressed through governmental policy at the national or local levels. Perhaps more concerning is the lack of rigorous evaluation of policies that have been developed to ameliorate farmer suicide rates. Both outcome research and process evaluation are essential if governments truly wish to make changes for the benefit of farmers in India. All existing policies and any future policies developed to address the well-being of farmers should include a rigorous evaluative component, which should be longitudinal, inclusive of the voices of farmers, and published in both publicly accessible formats and in peer-reviewed literature. Future research on farmer suicide and policy should also include an examination of the changing social contexts surrounding agriculture and agricultural finance in India (see the work of Sandanan [32] as an example). It should also include an examination of the impact of climate change on farming in India and policy changes needed to ensure farmer success in changing weather contexts.

Limitations

While informative, this study has several limitations. First, because of a desire to examine the most rigorous, and thus peer reviewed, evidence, our scoping review of the literature did not include news articles, government reports, or opinion pieces. Because of this, there may be evidence about the impact of policy on farmer suicide that we did not see. Second, eight of the studies that we examined used secondary data regarding suicide from either state of national sources. Obtaining reliable data regarding suicide is very difficult; this is true around the globe [36]. Therefore, any findings reported may be weaker as a result of poor-quality data. Despite these limitations, we believe that this scoping review begins an important conversation regarding effective, and effectively implemented, policies to decrease rates of farmer suicide in India.

CONCLUSIONS

Farmer suicide in India is a long-standing problem. Research suggests that causes include a complex range of systemic factors, which vary across regions in the country. Policy actions are needed to tackle this problem, yet our review found that little research has evaluated the impact of existing policies designed to address farmer suicide nor researched policy-level

interventions that could address some of these factors. In addition, existing literature suggests that policies may be being implemented in ways that decrease the likelihood of resources going to farmers most in need of support. Intentional and rigorous empirical study is needed to evaluate the impact of policies aimed at reducing suicide among farmers in India.

OTHER INFORMATION

Author Contributions

Each author contributed equally to this manuscript.

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Competing Interests

The authors have declared that no competing interests exist.

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