An inquiry into the Challenges Faced by Women Farmers in the village of Shivanahalli, Doddagade, and Kengeri in Karnataka

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I. INTRODUCTION

The intricate relationship between gender and the environment within the context of women farmers has emerged as a critical area of study. Agriculture, a sector essential for global food security, intersects with gender dynamics and environmental sustainability in complex ways. This research paper delves into the multifaceted interactions between gender roles, pesticide usage, and environmental implications within the lives of women farmers. For this study around 18 women farmers and farm workers in the villages of Shivanahalli, Doddagade, and Kengeri, were interviewed in the span of two months through six visits. A qualitative research study through interviews and focus discussion was done to understand the Pesticide use in agriculture and consequences of pesticide usage on health of women farmers. Women are directly and indirectly exposed to pesticides as active participants in agricultural operations, making them vulnerable to several health risks. Understanding the complicated relationship between women's health, pesticide usage, and sustainable agriculture is critical for promoting sustainable agriculture and protecting women's well-being.

This study was done weaving into the concept of difference feminism that emphasises and celebrates intrinsic differences that exist between men and women. It departs from the goal of achieving rigid gender equality in favour of emphasising, valuing women's distinct experiences, viewpoints, and capabilities. Women, according to difference feminism, have distinct talents and contributions that should be recognised and celebrated rather than suppressed or incorporated into a male-centric paradigm. This perspective is relevant in the context of pesticide use among women farmers, as it acknowledges that the impact of pesticides on women may differ from that on men due to their physiological differences, reinforcing the importance of considering gender-specific effects in environmental and agricultural policies.

While in connection to the environment and pesticide usage among women farmers, it is important to note that since men and women are built differently, the impact of pesticides on women is different from that of men too. A study by UNDP indicates that the impact of pesticides on women and men are different[3], this study attempts to show the issues

faced by women who are indulged in spraying pesticides, their knowledge of the issues, the correlation between the health issues faced and pesticide usage and, in the end, educating them to follow the safe methods of pesticide usage and informing them of the ill effects it can have on a woman's body.

The purpose of this study was to explore the relationship between women's health and pesticide usage. Investigate whether women farmers have access to the information and education from agricultural context. We will delve into many facets of this topic by analysing the data collected by interviewing women farmers of diverse range of age groups, existing literature, empirical studies, and case studies. The paper is an attempt to highlight the immediate and long-term health repercussions encountered by women exposed to pesticides and their need for information around health issues and access to health facilities.

[3]*Chemicals and gender | United Nations Development Programme*. (n.d.-a). UNDP. Available at: <https://www.undp.org/publications/chemicals-and-gender> [Accessed 5 July 2023].

II. METHODOLOGY

1. **Research Design:**

   This study employs a qualitative research approach to delve into the experiences and perspectives of women farmers in three villages of Karnataka, namely Shivanahalli, Doddagade, and Kengeri. The research design involves both individual interviews and focus group discussions to understand the extent of pesticide usage and its possible correlation with the health issue faced by women

2. **Sampling:**

   The study focuses on a purposive sampling method, selecting 18 female farmers from the villages. These farmers were chosen based on their active involvement in agriculture and pesticide usage. The sample size is small as interviews conducted were qualitative in nature and needed time and rapport with the farmers being interviewed. Hence to keep low on the cost and time of the study purposive sampling was done with a small sample size.

3. **Data Collection:**

   a. Individual Interviews: Face-to-face semi-structured interviews were conducted with each participant. The interview guide is designed to explore their daily routines, roles, health concerns, farm conditions, pesticide usage practices, knowledge of safe pesticide use, and any perceived correlations between pesticide usage and health issues.

   b. Focus Group Discussions (FGDs): Focus group discussions were organised to encourage open dialogue and group interactions among participants. The FGDs aimed to deepen the understanding of shared experiences, local practices, and communal perceptions related to pesticide usage and its effects.

4. **Data Analysis:**

   a. Thematic Analysis: The collected data, both from interviews and FGDs, underwent thematic analysis. The transcripts were carefully reviewed to identify recurring themes related to pesticide usage, health concerns, daily routines, and their interconnections.

b. Data analysis: Transcripts were analysed to label segments of data that relate to specific themes or concepts. This process aids in organising and categorising the information to facilitate meaningful analysis.

c. Pattern Identification: Patterns within and across interviews and FGDs were identified to uncover commonalities, variations, and connections. This process allows for a deeper understanding of the correlation between pesticide usage and health issues.

5. **Ethical Considerations:**

a. Informed Consent: Participants were provided with comprehensive information about the study's purpose, procedures, and potential risks. Informed consent was obtained from each participant before any data collection.

b. Confidentiality: Participants' identities and personal information were kept confidential. Data was anonymized during analysis and reporting.

c. Respect for Cultural Norms: The research team respected local customs, cultural norms, and language preferences to ensure a comfortable and respectful research environment.

d. Limitation: Due to paucity of time the initially selected 20 farmers could not be interviewed. The visits conducted were few and the interviews were sometimes conducted in the presence of other people which may at times influence the way the answers were provided.

III. REVIEW

In 2005, research was conducted by the Food and agriculture organisation of the United Nations, University of Florida and Wageningen University and Research said that the effects of pesticide usage do not impact men and women in different ways[4]. Another, report by UNDP in 2011, confirmed the effects of pesticides in men and women are different[5]. There are detrimental effects on the health of female farmers due to the usage of pesticides. Several researches suggest that the harmful effects of pesticides measured by their toxicity[6]. The toxic effects of pesticide exposure can range from mild symptoms like minor skin irritations or other allergic symptoms to major ones like a strong headache, dizziness, or nausea[7]. O*rganophosphates can cause severe symptoms like convulsions, coma, and possibly even death. Organophosphates (OPs) are the single most important group of agents responsible for poisoning in females. Women's exposure to pesticides in pregnancy is associated with miscarriages, premature births, birth defects, and low birth weight, largely because of transplacental exposure as well as transfer via breast milk during post-partum breast-feeding. Moreover, at particular stages of their lives, such as pregnancy, lactation, and menopause, women's bodies undergo physiological changes that may also change their vulnerability to health effects from toxic chemicals*[8].

A 2009 study, talks about high-risk groups exposed to pesticides include production workers, formulators, sprayers, mixers, loaders, and agricultural farm workers. The possibility of hazards is higher during the manufacturing and formulation processes because these processes aren't risk free. Moreover, in industrial settings, the workers are at higher risk as they are involved in handling various toxic chemicals, which include pesticides as well[9].

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[4]Mancini, F., Van Bruggen, A., Jiggins, J., Ambatipudi, A. C., & Murphy, H. (2005b). Acute Pesticide Poisoning among Female and Male Cotton Growers in India. *International Journal of Occupational and Environmental Health*. Available at: <https://pubmed.ncbi.nlm.nih.gov/16130962/> [Accessed 7 July 2023].

[5]Chemicals and gender | United Nations Development Programme. (2015, November 30). UNDP. Available at: <https://www.undp.org/publications/chemicals-and-gender> [Accessed 5 July 2023].

[6] Damalas, C. A., & Eleftherohorinos, I. G. (2011). Pesticide exposure, safety issues, and risk assessment indicators. *International Journal of Environmental Research and Public Health*, *8*(5), 1402–1419. Available at: <https://doi.org/10.3390/ijerph8051402> [Accessed 29 June 2023].

[7]ibid.

[8] Lekei, E., Ngowi, A. V., Kapeleka, J., & London, L. (2020). Acute pesticide poisoning amongst adolescent girls and women in northern Tanzania. *BMC Public Health*, *20*(1). Available at: <https://doi.org/10.1186/s12889-020-8374-9 > [Accessed 10 July 2023].

Pesticide exposure has also been linked to sensory deterioration. An incident related to this happened in Japan's Saku agricultural region, where people exposed to Organophosphates suffered from visual defects that included blurring of vision, eye movement disorders, myopia, and astigmatism[10].

To ensure sustainable agricultural development, need to regulate and control pesticide application while promoting the adoption of biopesticides and integrated pest management practices is imperative[11]. A case study examined the issue of pesticide exposure and poisoning in children in India, focusing on its severe and long-lasting health effects that impact children's human rights, particularly in low- and middle-income countries like India[12].

India's pesticide regulation law lacks robust safety standards and insufficient safeguards for farmers' health and the environment. There have been slow and insufficient efforts to amend and update the law[13]. While a significant percentage of farmers perceived the adverse effects of pesticide spraying on health, their overall awareness of pesticides' impact on the environment and other modes of entry was inadequate. Only a fraction of respondents used protective equipment during pesticide spraying, and improper pesticide disposal practices were common[14].

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[9]Aktar, W., Sengupta, D., & Chowdhury, A. (2009). Impact of pesticides use in agriculture: their benefits and hazards. Interdisciplinary Toxicology, 2(1), 1–12. Available at: <https://doi.org/10.2478/v10102-009-0001-7> [Accessed 16 July 2023].

[10] Lee, C. (2023, February 16). How pesticides impair our senses. BBC Future. Available at : <https://www.bbc.com/future/article/20230215-how-pesticides-harm-human-health#:~:text=One%20of%20the%20earliest%20known%20incidences%20occurred%20in,of%20vision%2C%20eye%20movement%20disorders%2C%20myopia%20and%20astigmatism.> [Accessed 10 June 2023].

[11]Sai, M. V. S., Revati, G. D., Ramadoss, R., Swaroop, A. M., Maheswari, E., & Mudigubba, M. (2019b). Knowledge and perception of farmers regarding pesticide usage in a rural farming village, Southern India. *Indian Journal of Occupational and Environmental Medicine*, *23*(1), 32. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6477948/> [Accessed 4 July 2023].

[12]Bhardwaj, T., & Sharma, J. (2013). Impact of pesticide application in agricultural industry: An Indian scenario. *ResearchGate*. Available at: <https://www.researchgate.net/publication/310792598_Impact_of_pesticide_application_in_agricultural_industry_An_Indian_scenario> [Accessed 13 July 2023].

[13]Prakash, M., & Donthi, N. (2022, June 18). *Pesticides regulations in India and the need for protection against health risks*. Economic and Political Weekly. Available at: <https://www.epw.in/engage/article/pesticides-regulations-india-and-need-protection> [Accessed 26 June 2023].

[14] Mohanty, M. K., Behera, B. K., Jena, S. K., Sajja, S., Mogane, C., Samal, S., & Behera, A. K. (2013b). Knowledge attitude and practice of pesticide use among agricultural workers in Puducherry, South India. Journal of Forensic and Legal Medicine, 20(8), 1028–1031.Available at: <https://pubmed.ncbi.nlm.nih.gov/24237813/ > [Accessed 6 July 2023].

The review highlights the pressing need for India to prioritise the improvement of pesticide regulation to protect the health of farmers, end users, and the environment. The adverse effects of pesticide usage on human health and the ecosystem necessitate a shift towards sustainable and ecologically friendly pest control methods. An aspect often overlooked in pesticide regulation is the varying impact of pesticide usage on different genders. Research indicates that men and women may experience distinct effects due to their diverse roles in agriculture and society. There is also a lack of data available for the health impact on Indian Women farmers of agricultural activities that are clearly chemical intensive. Therefore, there is a need for a large nationwide study in the area of health impacts and need for information on pesticide usage, amongst women farmers in India.

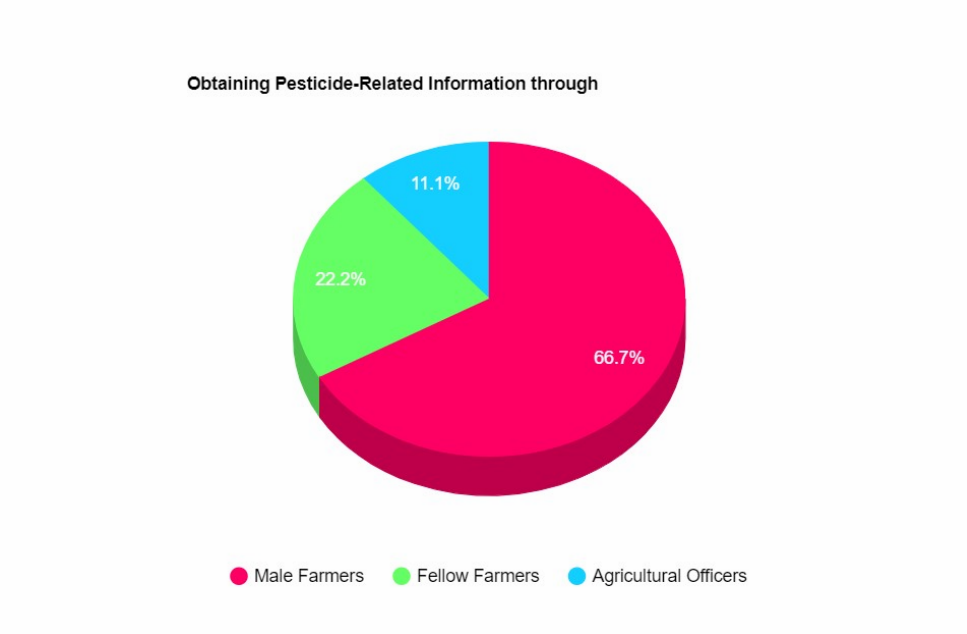
A. No source for new information as traditional wisdom fades

As increasingly the traditional ways of farming are being lost to chemical-laden agriculture, the provision for information in the latest technologies and agricultural information is absent. The training and support systems available to female farmers engaged in pesticide-related tasks. The data revealed a concerning trend in which information on pesticide usage often flowed through indirect channels. Instead of receiving direct training from reliable sources, female farmers reported obtaining information through male farmers (66.7%), agricultural officers (11.1%), or fellow farmers (22.2%). This indirect approach to knowledge transfer often leads to loss or distortion of crucial details and guidelines.

The consequences of this gap in knowledge transfer were evident in the reported health issues. Inconsistent practices, inadequate safety measures, and a limited understanding of potential risks resulted in various health problems among the participants. The lack of standardised training programs and direct access to accurate information hinders the ability of female farmers to protect themselves adequately while handling pesticides the after effects of pesticide usage Even through there are international standards that lay down that in case the companies cannot control the way in which the pesticide use is done, the sale of HHP(highly hazardous pesticides) must not be done in such countries, there is complete violation of international standards[15].

[15] The International Code of Conduct on Pesticide Management | Pest and Pesticide Management | Food and Agriculture Organization of the United Nations | IPM and Pesticide Risk Reduction | Food and Agriculture Organization of the United Nations. (2014). Food and Agricultural Organization of the United Nations.

To address this issue, there is a pressing need for direct and standardised training programs designed to empower female farmers with accurate information on pesticide usage, safety protocols, and potential health risks. These programs should cover a wide range of topics, including the proper handling of pesticides, the use of personal protective equipment, safe disposal practices, and recognizing the signs of pesticide poisoning. By bridging the knowledge gap and ensuring that practices align with health and safety guidelines, female farmers can better protect themselves and their health.



B. Farming by non-farmer farmers and impact on their health

While women in India form approximately 80% of the farming workforce, they do not have title to the land they work on and hence the agricultural schemes[16] The survey conducted among female farmers actively involved in pesticide-related activities brought to light a wide range of health issues. These issues encompassed various aspects of physical and mental well-being, reflecting the complex relationship between pesticide exposure and the health of these women[17].

Article 8- Distribution and trade. Available at: <https://www.fao.org/pest-and-pesticide-management/pesticide-risk-reduction/code-conduct/en/ > [Accessed 20 July 2023].

[16] Move over 'Sons of the soil': Why you need to know the female farmers that are revolutionizing agriculture in India. (2018, November 15). Oxfam India(OIN). Available at: <https://www.oxfamindia.org/women-empowerment-india-farmers > [Accessed 26 June 2023].

In line with studies[18] that show the impact of pesticides on the health of women farmers, due to their extended periods of time spent on the field were facing direct work related stresses. One of the most prevalent health concerns among the participants was visual discomfort. A substantial proportion reported experiencing eye irritation (55.6%), burning sensations (44.4%), and blurry vision (22.2%). These visual disturbances were strongly associated with their prolonged exposure to pesticides. The eyes, being a highly sensitive organ, are particularly susceptible to the adverse effects of chemical agents found in pesticides. The prevalence of these eye-related issues underscores the urgent need for protective measures and proper training to minimize ocular risks.[19]

Physical strains were another common issue among female farmers engaged in pesticide-related tasks. These physical strains manifested as back pain (61.1%), shoulder pain (33.3%), skin burns (38.9%), and hand irritation (22.2%). The high incidence of musculoskeletal problems emphasizes the physical toll that their work exacts. Pesticide application often involves repetitive movements and manual labor, which can lead to strain and injury over time. Adequate training in ergonomic practices and the use of personal protective equipment (PPE) are essential to mitigate these physical health risks.

Some participants reported skin irritation (11.1%), body aches (27.8%), and severe period cramps (16.7%). These gynecological impacts underscore the unique challenges faced by female farmers, where the chemicals they handle can potentially interfere with their hormonal and reproductive systems. Comprehensive support and education on reproductive health in the context of pesticide exposure are vital to address these concerns effectively[20].Respiratory issues have been often linked with the usage of pesticide or due to presence in the agricultural environment[21]. Respiratory challenges were also observed

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[17] Meenakshi, J. R., & Panneer, S. (2020). Occupational health of agricultural women workers in India. Indian Journal of Community Medicine, 45(4), 545. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7877425/ > [Accessed 20 July 2023].

[18] Schenker, M., Christiani, D. C., Cormier, Y., Dimich-Ward, H., Doekes, G., Dosman, J. A., Douwes, J., Dowling, K. C., Enarson, D. A., Green, F., Heederik, D., Husman, K., Kennedy, S., Kullman, G., Lacasse, Y., Lawson, B., Malmberg, P., May, J. J., McCurdy, S. A., . . . Chan-Yeung, M. (1998). Respiratory health hazards in agriculture. American Journal of Respiratory and Critical Care Medicine, 158(supplement_1), S1–S76. Available at: <https://doi.org/10.1164/ajrccm.158.supplement_1.rccm1585s1 > [Accessed 18 June 2023].

[19] Lee, C. (2023b, February 16). How pesticides impair our senses. BBC Future. Available at: <https://www.bbc.com/future/article/20230215-how-pesticides-harm-human-health > [Accessed 20

[20] Lekei, E., Ngowi, A. V., Kapeleka, J., & London, L. (2020c). Acute pesticide poisoning amongst adolescent girls and women in northern Tanzania. BMC Public Health, 20(1). Available at: <https://pubmed.ncbi.nlm.nih.gov/32156268/ > [Accessed 10 July 2023].

among a subset of respondents, with instances of asthma (16.7%) and persistent coughing (16.7%). These respiratory problems are consistent with the inhalation risks associated with pesticide use in agricultural environments. Inadequate protection and lack of respiratory safety measures can lead to long-term respiratory issues, necessitating interventions to safeguard the respiratory health of female farmers.

Joint pain (22.2%), stomach discomfort (22.2%), and headaches (11.1%) were recurrent complaints among participants, highlighting a broader spectrum of physical discomfort. These ailments can negatively impact the overall quality of life and work efficiency of female farmers, further emphasizing the need for comprehensive health support.

Prolonged sun exposure during work hours was identified as a specific environmental factor contributing to health issues. Some participants reported headaches (11.1%) resulting from excessive sun exposure, highlighting the importance of protection against outdoor elements. Sun protection measures such as hats, long-sleeved clothing, and sunscreen should be encouraged to prevent such health issues.

Additionally, unique cases emerged where work-related factors intersected with pre-existing medical conditions, adding complexity to the health dynamics in this context. One of the notable findings of the survey was the correlation between the duration of pesticide-related tasks and the prevalence and intensity of health issues. Participants who spent extended hours working (66.7%) reported a higher prevalence of health problems, (please mention number of hours)suggesting a potential correlation between the two factors. Those who worked longer hours exhibited more pronounced and diverse health issues. These issues included eye irritation (72.7%), blurred vision (36.4%), respiratory problems (45.5%), and gynecological health challenges (45.5%). The data suggests that longer work hours may contribute to more severe health problems among female farmers engaged in pesticide-related activities.

These body parts included the back (66.7%), knee (27.8%), shoulder (66.7%), eye (44.4%), hands (61.1%), and legs (27.8%). The uniformity in exposure patterns across different working hours highlights the need to delve deeper into the potential effects of differing work durations. The intricate interplay of various factors, including the duration

[21] Nicolopoulou-Stamati, P., Maipas, S., Kotampasi, C., Stamatis, P. J., & Hens, L. (2016). Chemical pesticides and human health: The urgent need for a new concept in agriculture. Frontiers in Public Health, 4. Available at: <https://pubmed.ncbi.nlm.nih.gov/27486573/ > [Accessed 1 July 2023].

of exposure, the type of pesticides used, and individual susceptibility, demands a comprehensive understanding of the underlying mechanisms. Addressing these health concerns effectively requires targeted interventions that consider both the duration of exposure and the specific health issues faced by the workforce.

C. Access to Health Facilities:

Access to healthcare facilities emerged as a significant concern among female farmers[22], with varying levels of access reported among participants. A significant portion of the respondents (44.4%) faced limitations in accessing healthcare facilities due to factors such as distance or financial constraints. This lack of access to medical care can have significant consequences, as untreated health issues may escalate and lead to severe complications.

Timely medical attention is crucial to mitigating health challenges and preventing them from becoming more severe. For female farmers, access to healthcare facilities is essential for addressing the health concerns that arise from pesticide exposure and other work-related factors. Efforts should be made to ensure easy access to healthcare services, including regular check-ups, early intervention, and appropriate medical care.

Improvements in healthcare access are crucial not only for addressing immediate health issues but also for preventing long-term health complications among female farmers. This includes regular screenings for pesticide-related health risks, such as respiratory problems and reproductive health issues. By ensuring that healthcare facilities are readily available and affordable, the agricultural sector can contribute to the overall well-being of female farmers. In essence, the survey findings underscore the critical need to address the multifaceted challenges faced by female farmers engaged in pesticide-related activities. These challenges span health issues, access to information and training, access to healthcare facilities, and the impact of working hours on their well-being.

It is essential to establish adequate educational, advisory, extension, and health-care services following the recommendations of pertinent legally enforceable instruments, as well as FAO and WHO guidelines, if needed[23].

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[22]Kalra, R. J. (2019, August 21). Access to health care difficult for most Indian women. dw.com. Available at: <https://www.dw.com/en/access-to-health-care-a-distant-dream-for-most-indian-women/a-50108512 > [Accessed 26 June 2023].

IV. CONCLUSION AND RECOMMENDATIONS

To mitigate the adverse health effects of pesticide exposure among female farmers, a holistic approach is essential. This approach should include:

1. Comprehensive Training**:** Direct and standardized training programs that empower female farmers with accurate information on pesticide usage, safety protocols, and potential health risks are vital. Such programs can bridge the knowledge gap and ensure that practices align with health and safety guidelines.

2. Improved Healthcare Access: Efforts to establish and promote easily accessible healthcare facilities for female farmers are crucial. Regular check-ups, early intervention, and appropriate medical care can contribute to reducing the impact of health challenges and preventing them from escalating into more severe conditions.

3. Environmental and Occupational Protection: Measures should be implemented to protect female farmers from environmental factors, such as excessive sun exposure, and to reduce occupational hazards. This includes providing access to personal protective equipment and creating safer working conditions.

4. Research and Monitoring: Continued research and monitoring of the health of female farmers engaged in pesticide-related activities are essential. This will help identify emerging health risks and tailor interventions accordingly.

By addressing these challenges comprehensively, stakeholders in the agricultural sector can not only safeguard the health and well-being of female farmers but also contribute to a more equitable and sustainable agricultural industry. It is imperative that the voices and needs of female farmers are heard and acted upon to create a safer and healthier working environment for these vital contributors to the agricultural sector. In conclusion, the findings of this report underline the necessity of recognising the different effects of pesticide exposure on men and women, calling for a change from a generalised

[23] The International Code of Conduct on Pesticide Management | Pest and Pesticide Management | Food and Agriculture Organization of the United Nations | IPM and Pesticide Risk Reduction | Food and Agriculture Organization of the United Nations. (2014). Food and Agricultural Organization of the United Nations. Article 6- Regulatory and technical requirements. Available at: <https://www.fao.org/pest-and-pesticide-management/pesticide-risk-reduction/code-conduct/en/ > [Accessed 20 July 2023].

to a gender sensitive and inclusive approach. A comprehensive plan to empower women farmers, protect their health, and promote sustainable farming practices is suggested, spanning policy reforms, healthcare support, and community involvement towards the issue on hand. India's agricultural sector advancement depends on equity, empowerment, and wellbeing of women farmers.