

## Article

# Securing a Sustainable Future: A Path towards Gender Equality in the Indian Agricultural Sector

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**Abstract:** The Indian agricultural sector is the world's largest producer of pulses, milk, and jute, and the second-largest producer of rice, wheat, vegetables, fruit, and cotton. Climate change threatens food security worldwide and has severely impacted the Indian agricultural sector. As a result of the unpredictable climate and low profits, economic uncertainty has forced men to seek employment in non-farming sectors. Under the deepening crisis, the farming landscape has transformed into a female-majority workforce. To identify pragmatic solutions to the deepening agrarian crisis, we employed a qualitative triangulation approach to our investigation of the feminisation of the farming sector, which was conducted in 2020. Our analyses of Indian media narratives, archive stories, responses to an online story completion task, and in-depth expert interviews show that, despite their developing role and increasing contribution, women remain marginalised and discriminated against in a culturally male-dominant sector. Supported by a long-term field ethnographic experience, we used Installation Theory to identify three domains in which policymakers can intervene to promote the interconnected issues of social sustainability, gender equality, and sustainable economic development in this sector.

**Keywords:** installation theory; social sustainability; food security; Indian agriculture; gender equity; women farmers



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## 1. Introduction

India is one of the world's largest food producers, in particular, of milk, pulses, and spices. It is the second-largest producer of rice, wheat, cotton, groundnut, sugarcane, fruits, and vegetables. Over the years, the Indian economy has grown and diversified: it has achieved self-sufficiency in food production, and the contribution of agriculture to the country's GDP has gradually declined, from 41.3% in 1960 to 15.9% in 2019 [1]. Despite this progress, most rural Indian households (70 percent; 770 million people) still rely on agriculture as their prime source of livelihood, and India is still home to 190 million undernourished people and a quarter of the world's hungry people [2]. Moreover, according to the recent 2022 Global Hunger Index, India still ranks 107th out of 121 countries [3]. Furthermore, agriculture, the traditional livelihood activity in India and the Global South, will be most severely impacted by climate change due to its dependence on climate-sensitive resources [4]. Crucially, the aggravating climate crisis increasingly threatens the livelihood of small-scale farmers [5–7]. Climate change and unpredictable monsoons have increasingly caused distress among farmers, both men and women. Food security is adversely affected by climate change [8]. The majority of farming households have marginal land holdings and are involved in resource-intensive cash crop cultivation, which is extensively rain-fed and climate-dependent. The cost of production has been increasing while profits have stagnated, placing farmers in huge debt. This has led to a catastrophic rate of suicide among male farmers [9–11]. Recent data released by the National Crime Records Bureau (NCRB)

in 2018 reveals that 10,349 farmers committed suicide in India in 2018 alone (9528 male and 821 female) [12].

Under deepening agrarian distress, the Indian agricultural landscape has been drastically changing as men out-migrate from villages to seek employment in non-farm sectors which, in turn, has increased pressure on women to participate in agricultural work with greater responsibilities. This phenomenon has been termed the “feminisation of agriculture” [13,14]. Consequently, scholars have argued that within the context of the agrarian crisis in the sector, the “feminisation of agriculture” is actually the “feminisation of agrarian distress” [15,16]. The “feminisation of agriculture” places women at the forefront of the climate crisis; as this sector engages a majority of women, climatic variability would greatly impinge on their livelihoods and magnify issues of food insecurity, loss of income, security, and welfare [4].

The issue of women’s integration and inclusion into the previously male-dominated farming sector has been the subject of many studies. Our literature review reveals a vast amount of research from the field of economics (peasant studies and development studies) and gender studies, which focus on a myriad of socio-economic constraints women farmers experience from their lack of access to resources (i.e., credit, agricultural knowledge, and extension education) [17–19], land rights [20], gender discrimination [21–23], limited agency or decision making for farm management [21,24], etc. Recent studies question the implications of agricultural feminisation for women’s empowerment [25]. A growing body of evidence postulates that empowering women in the Global South may lead to economic benefits not only for the women themselves but also for their households and communities [26]. Less attention, however, has been given to the potential impacts of women’s empowerment in agricultural settings through economic and non-economic means [27]. In a context in which women face structural challenges, policymakers’ failure to acknowledge the full extent of women’s involvement in agriculture leads to a gendered perception of agricultural work—a hierarchical perception of “activity status” where various traditionally male-gendered tasks are overvalued [28].

Public perceptions and attitudes towards women farmers are crucial in shaping policies, support systems, and societal acceptance of women’s roles in agriculture [4,27–29]. However, there is limited research examining how public awareness of women’s contributions to agriculture and the gendered expectations the public holds impact women’s ability to integrate equally into the farming sector and their sense of empowerment and well-being as they do so. Bridging the gap in public perceptions can lead to increased support and investment in initiatives targeted at empowering women farmers, as well as more gender-responsive policies that address the specific needs and challenges faced by women in agriculture [30]. For example, scholars argue that skills development training, which was found to be crucial for poverty eradication and social inclusion, tends to be strongly mediated by social expectations of gender, caste, and class [29]. Scholars also claimed that women farmers’ ability to exercise agency in the agricultural space does not necessarily translate into overall empowerment or a transformation of existing gender—or caste-based hierarchical power relations in society, as the latter will require interventions along multiple fronts [4].

Despite the crucial role of women in agriculture and their significant contributions to food security and rural economies, there remains a notable lack of comprehensive research on how women’s social inclusion as farmers in India informs their economic development [31]. While some studies have shed light on the economic and social challenges faced by women in agriculture, there is a need for more in-depth investigations that delve into the intricacies of the interconnectedness between women’s identities, roles, and experiences and their ability to equally and effectively economically perform within the farming sector [25]. In this paper, we aim to contribute to this emerging conversation. We examine novel ways of bridging the gap between economically focused and socially or gender-focused research by utilising Installation Theory, an interdisciplinary social psychological framework, offering novel ways to bridge this divide [32,33].

In this paper, we contribute to sustainability studies in four ways. Firstly, in our in-depth examination of the Indian feminised agriculture sector, we explore Indian public perceptions and the social representation of Indian women farmers as expressed through Indian media, an area that has received limited research attention to date. Secondly, drawing on our findings, we utilise Installation Theory as a tool to further identify non-inclusive and unsustainable behaviours that restrict positive social change and economic inclusion in the feminised Indian agriculture installation. The Installation Theory school of thought provides us with a unique perspective that links cognitive, psychological, social, and economic dimensions into one analytical framework, which can help scholars and practitioners leverage social–psychological knowledge to bring about pragmatic change. Thirdly, we develop short- and long-term pragmatic recommendations for interventions in this field that would provide policymakers, non-profit organisations, and philanthropists a detailed approach to empowering Indian women farmers, both socially and economically. In doing so, we further illustrate how the work developed by the “Installation Theory” school of thought at the London School of Economics can drive sustainable change in complex societal settings. Finally, we contribute to the literature on the Indian feminised agricultural sector by contributing to the emerging conversation in this field around finding novel approaches to women farmers’ empowerment and the debate around the value of incremental change in this area.

The paper is structured as follows: the subsequent section reviews the literature on the feminisation of the Indian agricultural sector. We then narrow down to focus on the social norms driving the constraints women face on a daily basis and pay specific attention to women’s restricted access to productive resources and ancillary support. In the third section, we delineate our study of the feminised Indian agriculture installation and our research design and methodology applied in approaching this case study. In the fourth section, we apply Installation Theory to analyse our data, searching for leverage points for intervention. In the fifth section, we outline our suggested interventions, arguing for the necessity of taking a nuanced, incremental approach to change by policymakers and other key actors in this field. This is followed by the sixth section, in which we discuss our findings and recommendations in light of the current literature on the social and economic empowerment of women farmers in India. We then present our conclusions, highlight the limitations of our work and make suggestions for further research.

## 2. Literature Review

### 2.1. *Feminisation of Agriculture*

The nature of agriculture in developing countries across Latin America, Asia, and Africa is transforming through the increasing participation of women in the workforce, a process which has been termed the “feminisation of agriculture” [13,14]. This change has been largely attributed to the neoliberal globalisation of agrifood systems, which has increasingly made small-scale agriculture less profitable and pushed men to out-migrate to non-farming sectors to diversify their incomes [34]. The inclusion of women in the workforce in any sector in any part of the world is often considered a significant drive for a country’s social and economic progress [35]. However, as the 2010–2011 report by the Food and Agriculture Organization (FAO) shows, the advantages of the inclusion of women in the agricultural workforce depend on several factors, including their participation in the workforce, their control over land or production, and the number and variety of constraints they encounter in different geographical regions across the world [36]. The data suggested that providing women with equal access to agricultural productive resources, such as land, livestock, use of inputs, information technology, agricultural machinery, irrigation, and financial services, would increase the productivity of farms by 20–30%. Furthermore, the report suggests that this would raise the agricultural output of developing countries by 2.5–4%, consequently reducing the number of hungry people in the world by 12–17%. In many countries, agrifood systems remain a major source of livelihood for women as

compared to men. In spite of this, a woman's access to resources, like those of input services, land, and digital technology, remains poor as compared to men [26].

In the Indian context, the substantial increase of women working within agriculture has resulted in them making up 62.9% of the Indian agricultural workforce in 2021, in comparison to 38.1% of male workers [37]. In contrast, India has been witnessing an overall decline in the participation of females in the workforce, according to a National Sample Survey [38]. The contribution of the feminisation of the agricultural sector to women's welfare has been debated. A key argument is that increased participation only superficially empowers women. Although it provides them with work outside of their domestic contexts and thus provides them with an opportunity for monetary income, the opportunity arises in the context of agrarian crisis and distress, forcing women to take additional responsibilities on the farm while continuing to fulfil their unpaid domestic responsibilities [16]. Furthermore, a study using occupational data from decennial Indian censuses from the last four decades (Census of 1981, 1991, 2001 and 2011) demonstrated that the feminisation of agriculture has a negative correlation with women's social and economic empowerment and is, in fact, strongly related to several indicators of poverty [15].

Despite the doubled work burden and the multitude of activities women perform, they continue to experience a myriad of socio-economic constraints and are gravely disadvantaged in comparison to men when it comes to the issues of time, wages, and work burden [21–23,39,40], and have limited agency over decision making and farm management [21,24,41]. Scholars have stressed women's lack of access to productive resources, such as credit, agricultural education [17–19] and, crucially, property and land rights [20,42]. Moreover, in their comparative study of two Indian states of West Bengal Gujarat, Pattnaik and Lahiri-Dutt (2020) also point out that women's economic output and productivity are unevenly impacted by socio-economic and cultural factors, such as household incomes, age, marital status, education, religion, caste, and social status [43]. There is also an intrinsic need to deeply analyse the additional work burden the feminisation of agriculture places on women. We need to better understand the benefits and shortcomings of the feminisation of agriculture for a balanced approach to creating a pathway for women farmers' overall development. Thus, within the context of changing roles of women and the feminisation of agriculture, it is crucial that the concerns of women farmers are recognised and addressed, not just for the goal of greater productivity but also for the goal of creating a just and sustainable society.

## 2.2. Women and Work: Social Norms and Constraints

In addition to the economic imperatives, social norms play a critical role in increasing the work burden of women in India. In the agrifood system, social norms discriminate between men and women, creating power imbalances, restricting women's opportunities. Gendered social norms restrict women's mobility, limit their work options (apart from their domestic chores), and limit their access to the market [26]. Micro-studies that undertake the gender mapping of agricultural activities show that 60–75% of farm-related activities across most regions in India rely on women [44]. Similarly, based on their survey in the Bundi district of Rajasthan with a sample of 200 women, Chayal and Dhaka (2016) discovered that the majority of the labour-intensive tasks, such as cutting, weeding, picking, cleaning, storage, and processing of grains, were undertaken by women [45]. The nature and participation of women within agriculture varies depending on the agro-production system they are involved in. For example, 70% of female cultivators are involved in cotton plantation and 90% in cotton picking [46], 47% in tea plantations, and 39.13% in vegetable production. Though these crops and activities are labour-intensive, women are considered unskilled workers [47]. Moreover, data from the Indian census of 2011 and 2001 show that the proportion of female labourers in the sector has risen, while the proportion of female cultivators or managers has decreased [48]. Thus, the feminisation of agriculture cannot be understood as managerial feminisation [49]. Men, on the other hand, are largely involved in ploughing and market-oriented economic activities like the purchase of seeds, fertiliser,

and pesticides and the sale of produce [44]. Additionally, while women are involved in the recurrent day-to-day activities from the time that the seed is sown to its harvest, men are often hired for one-time jobs like land preparation or fertiliser application [50].

In comparison to non-farm industries or sectors, the agricultural sector has the lowest wages [51]. Although women farmers perform intense labour in adverse conditions, they are paid less than their male counterparts [23,52]. Considering that rural women have low social mobility, their bargaining power for wages is also stunted. Whereas males and females are engaged in different jobs based on the social construct and the gendered division of labour, males and females are remunerated differently when working within the agricultural sector. This is largely due to the social perceptions developed over a period in the patriarchal setup, where women's capabilities are always looked down upon as compared to men's [25]. A survey conducted on the average agricultural wages for five agricultural tasks from 20 Indian states from 2006 to 2016 shows a striking gender disparity in wages [53]. The average daily wage rate of women in agriculture is 65–70% lower than that of men [44]. Furthermore, girls are preferred over adults in many agricultural activities since they are easy to instruct and can be made to work for longer hours in intensive jobs for significantly lower wages [45].

Depending on the land ownership of their household, women in agriculture take on a variety of roles, ranging from farm managers to landless labourers. Women from impoverished households are, for the most part, considered additional unpaid hands in home-based farming and, thus, sometimes end up working as both managers of their own farms as well as paid labourers on the farms of others [43]. Rao (2012) showed in her study that within the Indian rural context, men and women work together to establish the stereotypical gender roles—women as housewives and men as providers [22]. The pressures placed on women within these social orders limit them to low-productivity agricultural activities, as they must also retain responsibility for their households [54].

In fact, various studies highlight that women invest more time in agricultural operations than their male counterparts [52,55] as they carry the “triple burden of production, reproduction, and repressive societal norms” ([43], p. 26) within the rigid gendered division of labour that exists in Indian agriculture [21]. Rather than struggling for transformative change and asserting their identities as farmers, women focus on the incremental change in reconstructing gender relations and expanding their individual space in the household to gain reciprocity and recognition from their husbands within their own social realities [22].

### *2.3. Access to Productive Resources and Ancillary Support*

At the global level, less than 20 percent of landholders are women in spite of the fact that they comprise half of the total agriculture labour force [36]. In India, 70% of the total population and 80% of its impoverished live in rural areas. The most valuable asset for the rural agricultural economy is arable land [44]. Land provides security against penury and is a cultural symbol of status. Land rights and ownership have institutionally, legally, and historically been out of reach for women due to the gender biases and orthodox socio-cultural practices deeply embedded in the patriarchal fabric of Indian society. The Hindu Succession Act of 1956 was amended in 2005, and only then did women legitimately acquire ownership through inheritance, which is the primary route by which they gain land ownership [17]. A decade later, the Indian agriculture census (2015–16) indicated that only 13.87% of women own land in India. The average land holding owned by women is 0.94 hectares compared to 1.18 hectares in the case of men [56].

In her landmark study on land issues and the rights of women in South Asia, economist Bina Agarwal (1994) argued for effective and independent access to land rights for women on four counts of welfare, efficiency, equality, and empowerment. On the welfare count, Agrawal (1994) argues that direct access to land for women, rather than access mediated through the men in the family, reduces a family's risk of poverty [57]. Evidence from India and other developing countries shows that when women have access to economic resources, they use their income to fulfil household needs and benefit their children. In

contrast, men often spend on their personal needs, on items like alcohol and tobacco [58]. Research has further shown that the children of women who own assets in rural India are more likely to attend school and have greater access to medical resources [59]. Additionally, a longitudinal panel survey indicated that 49% of women without property ownership (land or house) had been subjected to long-term domestic violence compared to 18% or 10% who either owned land or a house and only 7% of women who owned both [60]. The equality and empowerment counts emphasise the importance of the right to land for women for gender equality and an equitable and just society. Equality in land rights is crucial for women's economic empowerment, which in turn increases their ability to confront the socio-cultural gender discrimination they face. Overall, Agarwal argues that land rights can enhance women's bargaining power: women can further gain agency and assert themselves in their public and private lives [17]. Finally, when there is gender equity in land rights, productive efficiency on farms is enhanced, as land ownership increases women's access to credit (as it serves as collateral) and to the much-required extension (technical aid, knowledge, and advisory services for farmers). Several other micro-studies also indicate that land ownership is the primary criterion on which the extension services are designed [61]. Thus, noteworthy studies from the field of economics and gender studies have consistently advocated for gender-equal land rights accompanied by the demand for women's independent and direct access to land in the context of the feminisation of the agrarian crisis in India.

### 3. Studying the Feminised Indian Agriculture Installation—Field Work and Methods

Multiple studies have investigated the feminisation of agriculture and barriers to women cultivators in the Indian context through a myriad of lenses and theoretical groundings; however, as discussed in the previous section, social and economic sustainability in this area is still far from being achieved. In this paper, we draw on two main sources to study the Indian feminised agriculture installation (see Table 1). The first is an original qualitative research led and conducted by our first and second authors in the summer of 2020, and the second is a more than decade-long ethnographic field experience of our third author (see Figure 1). In the next section, we present the field work and methods of our 2020 qualitative study.

**Table 1.** Data collection summary.

Study	2020 Qualitative Study Presented in This Paper			Longitudinal Ethnographic Work
Data source	Media review	Story completion task	In-depth interviews	Participant observations and on-ground leadership
Quantity	123 newspapers and archive articles	<ul style="list-style-type: none"> <li>45 original online completed stories</li> <li>Indian participants</li> <li>80–200 words long stories</li> </ul>	Four in-depth interviews with leading experts	Ongoing
Time frame	2010–2020 media publications	June–July 2020	<ul style="list-style-type: none"> <li>July 2020: three interviews</li> <li>July 2023: one follow-up interview</li> </ul>	2013–2023
Researcher	Led and conducted by the first two authors			Third Author



**Figure 1.** Celebrating Women Farmers on their Farming Plots. We would like to title the first image “Nurturing and Abundance”, the second “Determination”, and the third “Wisdom”. Pictures credit: Sugandha Munshi.

### 3.1. Data Collection

Our study was conducted during the COVID-19 pandemic, restricting data collection to online methods. Our goal was to capture a range of perspectives and representations [62]. To achieve this, we employed a qualitative triangulation approach to analyse Indian media and archives stories, narratives collected through an online completion task, and in-depth expert interviews. The data collection process also established a confirmatory and complementary relationship between the three sources of collected data that further enriched the quality of the study: a primary reading of the media articles (news and biographic accounts) informed the development of the story completion task and topic guide used dur-

ing the interviews with experts [63]. Before commencing the data collection process, ethical approval was granted by the Department of Psychological and Behavioural Sciences in the LSE. The research design, data collection, and analysis were conducted by the first author, who is a female of Indian nationality who has experience working on developmental issues in rural Indian villages as a social worker.

Firstly, we collected and reviewed media stories (from newspapers and archives), including nationwide discussions and biographical accounts of women farmers. Media plays a significant role in naturalising the social thought process and informing collective cognition, as it generates representations that both sustain and reproduce an installation [32,64]. Focused word searches were undertaken on Google and online newspapers and archives with an English readership. One hundred and twenty-three relevant articles were initially collected, which were then read several times and systematically narrowed down to fourteen key articles that were chosen to be analysed in greater depth [65]. By analysing how the media represents women farmers, we developed our initial understanding of the affordances, interpretative systems, and social norms that regulate behaviour in the Indian agricultural installation [66].

Secondly, we drew on a psychoanalytic projective technique, which, when used from a social constructionist approach, can reflect the contemporary discourses and people's sense-making drawn from their environment and experiences [67]. This method aims to reveal the socio-cultural discourses and power struggles that exist in the social world [68]. We designed a story completion task (SCT) aimed at extracting the socio-cultural norms that shape the gendered struggle of women farmers in agriculture. This approach was primarily adopted due to the constraints of accessing the field and interacting with stakeholders on the ground during the COVID-19 pandemic. In the SCT, we asked the research participants to compose a story based on a hypothetical situation, providing them with a short story stem and a set of instructions to guide them through the task [68]. Given the exploratory and open-ended nature of this method, a small pilot trial was run with 15 participants to check if the story stem could generate relevant data from the task [69]. The task was conducted electronically using Qualtrics ([www.qualtrics.com](http://www.qualtrics.com)) survey software, and the Prolific ([www.prolific.co](http://www.prolific.co)) platform was used to recruit participants. An important criterion for sampling was that participants were Indian nationals. A total of 30 participants (45, including the pilot) were recruited for the study who were educated, tech-savvy, and English speakers with possible exposure to Indian media. We collected and initially analysed 45 short (80 to 250 words-long) stories in which the participants drew on their past experiences of living or visiting relatives in rural villages. Twenty-two stories with at least 200 words or more were then selected for further in-depth analysis.

Lastly, to overcome the restrictions of our limited field access, we conducted semi-structured expert interviews to further gain insider knowledge and insights from the ground [70]. We approached twenty experts, including academics, activists, and social workers, all of whom were selected on the basis of their published work, their work experience within organisations that focus on working with women farmers in Indian agriculture, or their role as activists raising gendered concerns in agriculture. Out of seven responders, four agreed to be interviewed via Zoom or Skype. The online interviews allowed us to reach out to experts not just in India but across the world. We used a flexible topic guide (Bogner et al., 2018) [70], while the questions in the topic guide were informed by the initial analysis of the narratives that we collected from the media and through the story completion task, and thus consisted of a balanced mixture of informed questions and open-ended questions [71,72].

### 3.2. Data Analysis

Once the data collection process was concluded, the interviews were transcribed, and the collected data from all three sources were systematically thematically analysed using the NVivo 12 software for the purpose of coding. Firstly, we conducted a thematic analysis of the entire data set. The ensuing analysis was guided by the Gioia, Corley and Hamilton



(2013) methodology for rigorous inductive qualitative research [73]. Around 95 first-order codes emerged, which were then assigned to the information extracted from the data. It was important to maintain a semi-ignorant lens regarding the past literature during this inductive process. Subsequently, as the analysis progressed, the first-order codes were distilled through the merging and discarding of some expendable codes, a process that resulted in 36 codes. Eventually, these codes were assembled into second-order themes and then into two aggregate dimensions through an iterative process, which lent itself to theoretical analysis while allowing for the emergence of novel themes. The results of this analysis are presented in Section 4.1.

Following this process, we conducted a second analysis of the data, this time applying the Installation Theory framework as a tool to identify non-inclusive and unsustainable behaviours that restrict positive social change in the feminised Indian agriculture installation [32,33]. Our second analysis focused on the main subject of this paper, i.e., women farmers—aiming to better understand how their embeddedness in the system impacts their agency. In doing so, we paid particular attention to potential opportunities within the installation structure that could be leveraged as intervention points from which recommendations for sustainable social and economic improvements can be made. The results of this work are presented in Section 4.2.

#### 4. Findings—The Indian Feminised Installation

##### 4.1. First Analysis—The Daily Struggles of a Woman Farmer

Inspired by a 2014 photo exhibition series [74,75], we termed the two aggregated dimensions that emerged from the data: “visible work” and “invisible women” (See Figures 1 and 2). The first emphasises the role, responsibilities, and competencies of women farmers in comparison to men within their socio-cultural context, while the second highlights some of the major barriers to women as farmers in Indian agriculture. The contrast between the two aggregated dimensions stresses the issue of gender inequality in this sector: on the one hand, women’s work was clearly described by participants as essential and visible, but on the other hand, the women themselves were depicted as invisible within their ecosystem. This ambiguous portrayal of women farmers came across very clearly throughout our data analysis.



Figure 2. Working in the Dark. Pictures credit: Khyati Dharamshi.

Under our first aggregated dimension of “visible work”, three main secondary themes were grouped: gendered co-performance, gendered roles and responsibilities, and gendered competencies.

In the first secondary theme, “gendered co-performance”, the participants described the collaborative aspect of agriculture, one which depends on the combined work of males and females coming together to perform various cultivation activities, contributing their time and labour to the agricultural production process. Since most of the farming households own marginal landholdings, women play a pivotal role in agricultural productivity within the household, and when women move from one farming household to another through marriage, their labour is utilised for the benefit of their husbands’ entire household. Even though men and women were described as collectively navigating difficult socio-economic circumstances, this was described as taking place within a patriarchal context, where one gender has greater access to economic opportunities while the work of the other faces significant impediments:

*Women’s unfree labour, and it is precisely this unfreedom on the back of which men’s freedom is built—to migrate, to engage in comparatively better jobs, to escape social discrimination in the villages. Times of India, 28 January 2020)*

Nonetheless, some signs of progress were expressed by one of our interviewees:

*Men had migrated to Surat, when they came home, of course, the wife has to cook and to serve. That bit of patriarchy remains, but they are very conscious of the need to support her because she’s managing the farm. Although performatively, the woman says she’s a housewife, and the man says he’s the provider. (Expert A)*

Under the next secondary theme, we grouped participants’ perspectives on the contrasting “gendered roles and responsibilities” within Indian farming. The co-performers enjoyed a differential set of privileges. Across the three data sources, both women and men consistently maintained the narrative of women as housewives and men as the providers of the households, even though the socio-economic context and roles have changed significantly. Women farmers were type-cast as hard-working early risers who were resilient in the face of hardships and able to work extremely long hours (See Figure 2). They were described as responsible for domestic work, having family caring roles, required to care for the livestock, and as underpaid or unpaid workers on farms. This was especially prominent in the story completion exercises. The participants also stressed that one of the chief roles of women was that of reproduction and that the preference was for male offspring, the production of which is considered the woman’s responsibility by socio-cultural norms. Interestingly, patriarchal norms were described as affecting men just as adversely as they were affecting women. A tremendous amount of the economic burden is placed on men:

*The problem a man suffers is that of hegemonic masculinity. He is the head of the household, you know with a moustache and a turban on his head, and he is tall, and he is strong. What’s happening is men have just a few acres of land, and [they take loans given agriculture requires] huge input costs, and if there is a drought for two successive years [it] will wipe him out. He doesn’t know how to sustain the family. He’s at a loss. And so, what he is doing, is the problem of farmers’ suicides. (Expert B)*

This adds to the responsibilities of women: after the death of their husbands, they must repay the debts themselves. Women are left to fend for themselves and their families while managing a myriad of other gendered responsibilities. Similarly, in the case of male out-migration, men borrow funds from informal sources, and females repay this debt with their labour:

*When migrating, men often borrow money for their initial expenses in the city. The sources of credit are informal—primarily the landed elite who are also the main source of agricultural employment. In return, women from these indebted households provide priority or tied labour services to their creditor households. (The Times of India, 28 January 2020)*

We termed the third theme under the aggregated dimension of “visible work” as “gendered competencies”. Since males and females perform distinct roles, they also develop competencies in the agricultural installation differently, a gap that is reinforced through training and education, which encourages gendered skills and interpretative systems. For example, financial and market-oriented decisions and activities were described as mainly managed by men. Consequently, women’s economic labour in household, farm or livestock care was depicted as controlled, with men denying agency to women and with economic gains playing a key role in developing decision-making capabilities. It was interesting to learn, however, that even under these difficult circumstances, women succeed in developing the required competencies to independently manage their farms. Our data further revealed how women farmers embody capabilities to farm as they navigate through the agricultural installation:

*If my husband were alive, I’d still have worked my farm, but may not have known the economics of it,” says a five-feet-something Ujjwala. Among the many things she tried on the fields, she realised diversified agriculture is the best strategy to reduce losses and increase income. “I planted sugarcane on the farm just to see if we can cultivate it; the yield was bad, so I did not go ahead,” she says. (People’s archive of rural India, 12 March 2015)*

Under our second aggregated dimension of “invisible women”, we grouped two main secondary themes: “ambiguous identity” and “invisibility within the system”. The first secondary theme, “invisible women”, was used to group participants’ perspectives on the identity of women farmers, which was described as surprising, conflicting, and ambiguous. As one of our participants in the story completion task described it:

*I was so excited to meet Sandhya because I always imagined a farmer to be a man. In this case, I was so happy to see her. (SCT)*

An interesting insight shared by several of the experts was that women’s identities as farmers need to be socially recognised and acknowledged. Lack of land ownership due to the patrilineal nature of Indian inheritance norms, they argued, was the primary cause for this ambiguity and a major impediment for women. Socio-cultural norms and practices that govern land access are skewed towards men, given the fact that women were not allowed to own land until 2005. A woman’s struggle for land rights is incongruent with their struggle to survive within a patriarchal society. Addressing this issue can substantially improve their position in the social world, as well as increase their agency and bargaining power in both the private and public spheres:

*If female farmers are provided security of land tenure, they will be officially recognised as farmers and hence will see their bargaining power, self-confidence and agency will slowly grow and expand. (The Indian Express, 4 August 2017)*

Under the next secondary theme, we grouped the participants’ insights regarding women’s ‘invisibility within the system’ and how it impacted their agency and productivity. Patriarchal norms, lack of land ownership, and the general understanding of women as housewives significantly constrain women farmers, as they make them invisible within the agricultural ecosystem in areas like credit, market, technology, extension services, and policy frameworks.

Women are denied access to credit due to their lack of assets or land ownership, which pushes them to seek loans from informal sources, prevents their participation in micro-finance institutions, and systematically excludes them from being titled as farmers. Apart from a lack of access to credit, women are subjected to discrimination, even in markets, or struggle with labour access as independent farmers. Women also face considerable challenges when it comes to adopting improved technology and machinery, as they are often not designed to meet their needs.

*“Agriculture is not women-friendly,” Ujjwala says. “When I go to a bank, clerks don’t take me seriously; when I go to market, men stare at me as if an outsider has*

*intruded their bastion,” she says. “Farm labourers, even women, don’t come to my farm easily.” (People’s archive of rural India, 12 March 2015)*

*. . . women said that the spray cans that they use to spray pesticides in the fields, these cans weigh 25 litres, and so it is difficult for them to carry on their back and then spray. They said, why can’t they make smaller cans? This is such a simple innovation yet completely overlooked. (Expert B)*

*First and foremost, women need to be the direct participants of the training programs, to expect that giving training to their husband and they take it home. It doesn’t work. Secondly, you have to be extremely sensitive while organising training programs. There are unspoken challenges; they can’t travel 10 km to attend the program; it has to account for their time as well. They have very limited time in a day, and you need to reach out to them ask them their availability. Most importantly, you need a female trainer, you know and, if women can’t read and write well, then you need to get agro advisories, on telephonic voice calls, in their local language, they can understand it as simple as that. (Expert C)*

A major bottleneck in the installation is the statistical invisibility of women farmers within institutions due to the prejudice and prevalent patriarchal norms that dictate the system. This invisibility is caused not only by the design of the criteria but also by failures of description on the level of local governance and by policy makers. The exclusion of women institutionally is shaped by the apathy and inaction of the patriarchal and gender-biased state machinery. There are limited policies and budget allocations aimed at addressing the concerns of women farmers:

*Suicides by women farmers are less common but not that unusual. But they don’t get recorded because women are often landless [ . . . ] In most cases, suicides by women farmers are classified as dowry deaths or accidents. . . (The Times of India, 17 May 2015)*

*Women farmers coming from the landed families often end up in the catch-all-categories column of ‘housewives’ . . . That is the easiest category to throw a woman in data collection. [ . . . ] It’s not just prejudices at the time of data collection [ . . . ] The prejudices that came into the data were societal and not the basis of the survey. That was the prejudice of the constable at the village level (who captures the suicide data). (The Indian Express, 31 January 2020)*

*I think the main problem is not at the local level between men and women. It’s the state that is blind, in terms of its policies. It’s a patriarchal state, and it’s completely gender blind. They think that whatever is given to the man, as the head of the household, is fine for the rest of the family, the wife is seen as part of that. But we know this is not the case. (Expert A)*

#### 4.2. Second Analysis—Applying Installation Theory to Search for Leverage Points

In this study, we examined the feminised Indian agricultural installation in the context of the feminised agrarian crisis and climate change that unequally impacts women [15,76]. We are primarily focused on the key social actors, i.e., women farmers, in order to search for leverage points that will allow us to make practical recommendations that would drive the Indian agriculture sector towards better social and economic sustainability. Here, we will further analyse our findings from the perspective of Installation Theory, which will enable us to suggest informed intervention pathways for greater sustainability across the three layers of the installation. In Table 2, we summarise our findings of the key challenges and obstacles that women farmers face across the three layers of the Indian feminised agricultural installation.

**Table 2.** Summary of challenges across the three layers of the installation.

Key Findings	Selected Quotations	Challenges across the Installation Layer		
		PL	EL	SL
Limited land ownership by women, given that historically property rights were patrilineal in nature; while equal inheritance was formally only implemented in India in 2005, women's property rights are far from actualised.	<ul style="list-style-type: none"> <li>Land rights structurally escape women. This is a fundamental issue in why women's work as farmers is largely invisible. (The Wire, 20th February 2019)</li> <li>The status of a farmer has got entangled with land and land ownership. This is because of the patriarchal nature of the household and the patrilineal nature of inheritance. A mere 13–16% women have actual land ownership in the country. (Expert A)</li> </ul>	X		X
Lack of investment and innovation in farm machinery and equipment that are conducive to women's usage. Despite the fact that over time the agrarian crisis has led to an increasing percentage of the workforce being made up of women, the available equipment is still suited for male farmers.	<ul style="list-style-type: none"> <li>It is important to have gender-friendly tools and machinery for various farm operations. Most farm machinery is difficult for women to operate. Manufacturers should be incentivised to come up with better solutions. Farm machinery banks and custom hiring centres promoted by many State governments can be roped in to provide subsidised rental services to women farmers. (The Hindu, 15th October 2018)</li> </ul>	X		X
The land is a critical asset for farmers: it is used as collateral to access credit. Given that the majority of women lack land ownership, they also face exclusionary treatment in banks or financial institutions.	<ul style="list-style-type: none"> <li>Women have no entitlements. As farmers, they don't have land, which impacts their access to credit. They didn't have cash and credit cards when I looked into Dumka district in Jharkhand (State) only 2 to 4% "Kisan" credit cards were in women's name. (Expert A)</li> </ul>	X		X
Agriculture advisory and training (extension services) often exclude women as they are often time-deprived; these teachings are not delivered in their local languages or are not in close proximity to their homes, or are not conducted by female facilitators. Thus, women are deprived of the chance to build relevant skills and knowledge.	<ul style="list-style-type: none"> <li>Women don't have access to the extension support as well. When you talk to extension agencies, they say that, no, women don't come. The thing is that women are so busy doing work that they have no time to come. They have no resources, and they have no money to invest. So they are not members of even cooperative societies. (Expert A)</li> </ul>		X	X
Women farm labourers are often underpaid in comparison to their male counterparts, and their paid work is restricted to gendered tasks.	<ul style="list-style-type: none"> <li>It's beneficial for women to go and work on other people's farms. Because that way, our wage relationship is established even if it's underpaid. (Expert B)</li> <li>When a woman goes out on the farm to tend to the crops, [or] to clean the weeds and help the husband, it's on the family's farm. She is extending her unpaid labour, the care so-called reproductive set of activities from household to farm. Women are actually doing productive work, but that productive work is coming as part of a reproductive package that she marries into. (Expert B)</li> </ul>	X	X	X
Unequal access to markets for women farmers, as the market spaces are primarily male-dominated; in addition, women often find it difficult to access the market due to time, travel, and monetary constraints.	<ul style="list-style-type: none"> <li>At the local galla mandis (markets) too, women farmers face serious discrimination, and are offered raw deals, often laced with sexual harassment—to which no legal recourse is ever sought or granted. (The Wire, 13 September 2017)</li> </ul>	X		X

Table 2. Cont.

Key Findings	Selected Quotations	Challenges across the Installation Layer		
		PL	EL	SL
<p>Given the gendered division of labour in farming and gendered social norms, women are often excluded from building on-farm capabilities—specialised skills, market, and business skills. Additionally, women also have limited agency with respect to decision-making, negotiation skills, and bargaining capacity within their households, markets, and society. However, given the resilience of the installation, in circumstances where women are widowed or in cases where their husbands migrate to other sectors, women learn these skills through different mechanisms—feedback, feedforward, imitation, instruction guidance, etc.</p>	<ul style="list-style-type: none"> <li>• <i>If a land title is a complicated issue, it is still important to at least recognise women as equal farmers [. . .] Basically, I see land as a symbolic asset about who you are, what is your family history? What is your rootedness? What is your sense of belonging, so within a patriarchal society, clearly that belongingness comes from the male line, which is more difficult to shift! . . . we can start making some headway by giving women equal entitlements and enabling them to function as farmers, given they already have the skills. (Expert A)</i></li> <li>• <i>The inclusion of women in labour markets has taken place under very adverse conditions. Bearing a greater burden of responsibility has not translated into decision-making powers over important issues. (The Times of India, 28 January 2020)</i></li> <li>• <i>[C]ompared to men, women generally have less access to resources and modern inputs (seeds, fertilisers, pesticides) to make farming more productive. (The Hindu, 15 October 2018)</i></li> <li>• <i>As more women are getting into farming, the foremost task for their sustenance is to assign property rights inland. Once women farmers are listed as primary earners and owners of land assets, acceptance will ensue, and their activities will expand to acquiring loans, deciding the crops to be grown using appropriate technology and machines, and disposing of produce to village traders or in wholesale markets, thus elevating their place as real and visible farmers. (The Hindu, 15 October 2018)</i></li> </ul>		X	X
<p>Women’s identities as farmers are unrecognised by the ecosystem, and they suffer from a lack of equitable access to the farmland and productive resources—water, credit, extension services, etc., even when the agriculture installation is resilient enough to enable women to build the farming skills irrespective of the gender of the farmer.</p>	<ul style="list-style-type: none"> <li>• <i>. . .the agrarian sector employs nearly 80% of women workers. Despite such high numbers, both the sector and the macroeconomic policy framework are yet to recognise them as farmers. . . The trends since 2014 show that not only does the policy framework suffer low levels of allocation and spending but also show how misplaced the government’s priorities continue to be in the agrarian sector with respect to women farmers. (The Wire, 20 February 2019)</i></li> <li>• <i>When a woman stands on a farm and cultivates crops, she is a farmer. No one, no organisation, can give or take away that identity. You can’t give them an identity. They already have it; the ecosystem needs to recognise it. So putting their names on paper might establish their identity in the structural world. You know make it more concrete as it will also ease their lives as farmers immensely. (Expert C)</i></li> <li>• <i>In public gatherings, when ministers are addressing agricultural concerns, they will just refer to Kisan bhaiyo (farmer brothers), there are women farmers sitting in huge numbers, recognising them as farmers..! (Expert C)</i></li> </ul>	X	X	X

Installation Theory is a comprehensive and applied framework that allows us to examine behaviour as regulated by the combination of three layers (physical, embodied, and social); an installation is distributed across the three layers, all of which combine to channel and regulate human behaviours [32]. The framework suggests that in addition to

the embodied interpretative system (e.g., motives, representations, habits, or preferences) of individual subjects, human behaviour is governed by context (e.g., material objects (artefacts), rules, regulations, or other individuals). Lahlou (2017) defines an installation as a “specific, local, societal setting, where humans are expected to behave predictably” [32] (p. 16). The three layers constituting the material environment (affordance), individual competence (embodied intelligence), and social regulations (norms) come together as a functional unit to channel behaviour predictably for the smooth operation of society. The endurance of an installation is mirrored in the power struggles between stakeholders, as there exists differential agency for different stakeholders in an installation. Within the installation, this agency is distributed across the three layers. Installation Theory allows us to compartmentalise and analyse the three sub-layers and their complex interactions with one another within an installation for practical purposes, to identify the forces that shape problematic behaviour and to suggest ways of resolving issues in real-world settings.

In the “physical layer” of the feminised agricultural installation, women farmers lack material agency due to governing patriarchal norms. They have no land entitlements, even though they are the primary farmers within the feminised agrarian context. This severely affects their access to resources like credit and extension. In comparison to men, women have less access to technology, machinery, markets, and modern tools like seeds, pesticides, etc. In the world of the new normal now, they are left behind as far as the digital world is concerned. Additionally, their economic labour is inconspicuous and undervalued as it is often taken for granted as part of the family enterprise, both institutionally and by the community. Moreover, they are often confined to drudgery on farms as labourers and are underpaid. The farm machines are mostly gender-blind. Women are also physically constrained with no freedom to find better jobs, as they are time-poor because of the imperative to multi-task and be responsible for household chores, care work, livestock care, and farm work.

The second “embodied interpretative” layer is similar to the physical layer in that women within the installation have limited agency and access to the embodying competencies necessary to function in the agricultural installation. The extension and agricultural advisory typically disregard women as farmers and fail to provide customised training and advice inclusive of women’s needs. The biased extension system, where even when women want to access knowledge and advisories, the social ecosystem makes it difficult for them to interact with male extension agents [30]. However, the agricultural installation is resilient enough for women to embody the relevant skills through varied mechanisms, such as feedback and feedforward (vigilante effect), and through voluntarily seeking guidance from their husbands or other family members. Lastly, the findings showed that the patriarchal norms and roles embodied by women and actors in the community at large reduce women to mere extensions of a household as homemakers and portray men as providers and breadwinners.

The hegemonizing “social layer” is omnipresent across the installation and influences the physical and embodied layers. In the Indian agricultural installation, it appears primarily through the patriarchal norms which force women to conform to socially ordained roles and responsibilities. These norms are reified in social practices like dowry or through the reproductive duties of women, such as preferentially giving birth to the male child. In addition to the gender-blind institutions and government machinery that discriminate against women, their visible work is made invisible in the social layer due to the deeply rooted patrilineal regulations of the social fabric. Even though the inheritance laws in India were progressively revised in 2005, women’s property rights are a long way from being actualised [77]. Additionally, women are denied social agency in agriculture as they have no decision-making or bargaining power or access to social support.

## 5. Recommendations for Practical Improvements

Installation Theory enables one to make sense of a complex issue by compartmentalising an installation into three distinct layers (i.e., physical, embodied, and social), identifying

the critical challenges across the three layers and investigating the way they reinforce each other and thus making the social setting resistant to change [32]. Installation Theory suggests, however, that informed and thoroughly designed interventions can target any one of the three layers to shift the system towards desired behavioural change [78]. In this section, we draw on the two main data sources that informed our analysis and finding presentation in the previous section to develop feasible, pragmatic recommendations that can drive meaningful, sustainable change for Indian women farmers in both the short and long term. The below recommendation emerged through a process of long discussions between the three authors of this paper and, therefore, also draws on our diverse backgrounds and skill sets as scholars and change leaders. It is practically impossible to design real-world interventions that will affect each layer of such a socially complex installation in isolation. With this limitation in mind, the first group of recommendations aims to improve women farmers' access to productive resources and, in this sense, targets more clearly the physical layer of the installation. The primary goal of the second group of recommendations is to promote public and societal awareness of the key role that women play in Indian agriculture and is, therefore, more heavily oriented toward addressing the institutional or social layers of the installation. The final set of recommendations focuses mainly on empowering women farmers', building their vocational and social skills, and enhancing their well-being, and can, therefore, be seen as primarily targeting the embodied or competence layer of the installation.

### *5.1. Improving Women Farmers' Access to Productive Resources*

We have shown that resources are far from being equally distributed within the Indian feminised installation: farm equipment and machinery, livestock, credit and access to banks, educational and extension service settings, marketplaces and even the natural environment (natural resources, such as water, soil, and climatic conditions) are all gendered. Our first set of interventions is aimed at suggesting viable pathways to degendering agricultural resources in both the shorter and longer terms.

#### *5.1.1. Taking Gradual Steps towards Overcoming Economic Discrimination*

We have seen that women farmers commonly face significant barriers to owning land due to the deeply ingrained patriarchal social norms. Not being able to claim the title of a "landowner" has further severe economic and social consequences, such as being denied access to the most essential productive resources. Full participation in the agricultural socio-economic system is strongly linked to land ownership titles, depriving women of access to means, such as credit, extension knowledge, technology, etc. [61]. Without land ownership, women farmers often face difficulties in accessing crucial agricultural resources, such as seeds, fertilisers, and modern farming equipment. This can result in lower crop yields, reduced profitability, and an overall dependence on male family members or middlemen for resources. It further restricts their ability to make decisions regarding farming practices, their access to credit facilities, and avail the government support meant for land-owning farmers. Additionally, financial institutions and banks in rural areas hesitate to provide credit to women farmers without land ownership, considering them as higher-risk borrowers. Consequently, women may resort to informal lending sources with higher interest rates, leading to a vicious cycle of debt and economic vulnerability [79]. Women farmers without land ownership often have little say in the decision-making processes related to farming and agricultural activities. Important choices concerning crops, market access, and investment are primarily dominated by male family members or local community leaders [57,80,81].

Moreover, women's social statuses and well-being are also significantly hindered [28]. Women's vocational identities as farmers are often confined to their position within their families, i.e., "Farmers' wives" [22,42]. Despite being skilled in farming activities and having the knowledge to undertake complicated farming tasks, women are not socially acknowledged as farmers because of their lack of land ownership [30]. As such, not being



able to own land not only denies women from accessing economic means but also restricts their opportunities to acquire social and cultural capital [12,82]. Our first recommendation aims to tackle this problem by providing an immediate, short-term solution that will improve women's social and economic statuses within the farming sector. We will further discuss interventions that are aimed more specifically toward driving change in the actual land ownership patriarchal social structure in the middle and longer term below [83].

#### 5.1.2. Introduce a Mahila Kisan (Female Farmer) ID Card for Skilled Women Farmers

We suggest disassociating the vocational identity and social status related to being a "farmer" from land ownership. In the longer term, however, consistent efforts must be made to allow women to obtain equal land ownership rights. We argue that farmers should be identified based on their know-how, knowledge, experience, and farming skills embodied by them as individuals. Thus, embodied vocational competencies should be the defining factor on the basis of which someone may be titled "a farmer": this change paves the way to create socially recognised visual markers that can visibly signal women as recognised farmers [84,85]. This definition should be supported institutionally by the government: for example, women farmers can be provided with a Mahila Kisan (female farmer) ID card that shows their occupational status and which can be used as proof when seeking support from ancillary ecosystems like extension services, sub-advisories, credit from national banks, etc. This recommendation draws on many consumer psychology studies demonstrating the effectiveness of social status signalling within markets [86,87]. Moreover, using skills acknowledgement certificates was shown in experimental studies to be particularly effective in reducing gender biases [88]. Moreover, we believe that this recommendation has a good chance of being positively accepted by policymakers, drawing on a neglected legislative initiative that was proposed in 2011—The Women Farmers' Entitlements 2011 Bill—which was presented in the Rajya Sabha (Upper House of Indian Parliament). This welcomed initiative has, however, regrettably remained dormant since its proposal [89]. We, therefore, recommend that locally recognised governmental bodies and non-profit women's rights activist organisations, such as Mahila Kisan Adhikaar Manch (MAKAAM—Forum for Women Farmers' Rights), lead with this initiative until such legislation becomes a reality.

#### 5.1.3. Promoting Gender-Inclusive Technology, Research, and Innovation

Another critical issue that requires attention to make the feminised agriculture installation conducive for female farmers is prioritising investment and innovation in gender-inclusive agricultural technologies and machinery—making the physical affordance conducive within the installation. To enhance women's involvement in higher-value activities within global agri-value chains, leveraging technology becomes crucial. Existing studies emphasise that encouraging technology adoption among women farmers can lead to increased economic benefits at the grassroots level and foster significant social inclusion. However, numerous gender-related barriers hinder women's access to technologies, and the available technologies often fail to cater to their specific needs [90,91].

Around the world, traditional gender roles in agriculture result in men and women assuming different responsibilities in production, processing, and marketing, often leading to distinct technology usage patterns. Women are predominantly involved in physically demanding tasks, such as sowing, transplanting, weeding, bird scaring, harvesting, threshing, winnowing, drying, and storing seeds and food grains. To alleviate the time and labour burdens faced by women in agriculture, the adoption of context-specific labour-saving technologies is instrumental [92,93]. Women lag behind men in the adoption of agricultural technology [94] due to various barriers, including limited access to capital, inputs, and services (such as information, extension, credit, and fertilisers), physical accessibility challenges, and prevailing cultural norms [95,96]. It is, therefore, essential to offer infrastructural support through technological innovation and research that addresses the specific needs of women. Research suggests that technological design, innovation,

and scientific research often overlook women's needs as primary users of technology [97]. Given the context of feminisation, it is critical for technology investment and research to address the needs of women on farms and reduce their workload, saving time and reducing drudgery when it comes to labour-intensive tasks. The machines being developed for better agronomy practices and improved farming must consider women's needs and aspirations at the centre of their design. The whole farm mechanisation industry needs "gendered greasing" [30]. Investing in gender-responsive and gender-friendly technologies, policymakers, philanthropists, and other private sector stakeholders will allow agricultural households and communities to have access to tools and machinery that can make feminised agriculture more productive, increase women farmers' incomes, and contribute to the well-being of their families and the broader community [98]. Studies have shown a strong correlation between the demands on women's time and children's nutrition within the household. Thus, technologies that can improve women's time availability have the potential to improve the overall nutrition of the household [99]. Additionally, this will also lead to more efficient and sustainable agricultural practices that benefit the environment and promote long-term sustainable economic growth. Crucially, women's ability to access technology depends on their ability to make time to access vocational training settings, which require additional consideration such as providing them with adequate support services, including childcare, access to clean drinking water, sanitation, and fuel. These crucial considerations require further research and should not be overlooked in the pursuit of women's technological empowerment in the agricultural sector [96]. In particular, our analysis highlights the need for further research focusing on the provision of childcare facilities, especially for mothers of young children.

#### 5.1.4. Long-Term Legal Reforms for Pay and Price Parity for Women Farmers

Pay and price parity for women farmers is an essential step toward achieving gender equality in agriculture. Our findings show that despite playing a significant role in food production and rural economies, women farmers often face discrimination in terms of compensation for their labour on farms and the prices they receive for their agricultural products in markets [28]. Closing the gender pay gap in agriculture is crucial to empowering women, enhancing their economic opportunities, and contributing to overall agricultural productivity [26]. Firstly, the gender wage gap is a prevailing issue in the agricultural sector, wherein women working as labourers often receive lower pay compared to their male counterparts despite performing the same work [26,36]. This disparity perpetuates economic inequalities and hinders progress toward gender equality in rural communities [100]. Secondly, women farmers face considerable challenges in accessing markets due to the social and cultural norms that restrict their mobility and participation in economic activities beyond the household. Consequently, they encounter difficulties in negotiating fair prices for their agricultural produce and have limited opportunities to explore alternative income sources [97].

For sustainable and equitable agriculture, we recommend middle and longer-term legal reforms in which governments and agricultural institutions must enforce policies that ensure fair and equitable pay and prices for agricultural products, irrespective of the gender of the producers [88]. Moreover, market prices hold a significant influence on women farmers, and certain aspects of the market dynamics affect them differently from their male counterparts [21–23,39,40,43]. One such aspect that policy makers can pay further attention to is the issue of the negotiation of prices for women's agricultural products, wherein women often encounter hurdles that result in lower returns for their hard work and investments [18]. Moreover, women are often relegated to backstage work such as product preparation yet denied access to post-harvest frontstage activities, such as marketing, leaving them exposed to the consequences of market price fluctuations [28]. If market prices for their products decline, their income and economic stability are profoundly affected, perpetuating the cycle of gender-based economic disparities [24,28]. Additionally, women farmers' access to market information and networks is often limited, preventing them from

identifying better market opportunities and obtaining fair prices for their goods. In addition to the much-needed legislative changes, we also suggest in the next sections interventions that would help women farmers develop their financial and vocational knowledge as well as their negotiation skills, empowering them to take more frontstage roles [25,28]. Addressing these challenges requires targeted legislative as well as grassroots efforts to empower women farmers, promote gender-inclusive policies, and foster an environment that ensures equal opportunities and fair compensation in the agricultural sector. Ensuring pay parity and fair prices for the goods produced by women farmers will recognise their valuable contributions and also improve their livelihoods, bolstering their families and communities [25,30].

## 5.2. Improving Women Farmers' Public Social Representation, Driving Social Inclusion

Restrictive social norms hinder not only women's access to essential productive resources but also prevent them from social equality and gaining social recognition for their contribution to the agricultural sector. In this section, we make several recommendations aimed at improving women's social life and well-being. Our recommendations target public perceptions of women farmers through various means, such as changing the way women are visually depicted in the public sphere alongside the way in which they are verbally approached and recognised. We also recommend that government officials, researchers, policy makers, bank officials, and extension service providers undergo gender-sensitive training programs so that they become better equipped to cater to the needs of women farmers.

### 5.2.1. Improving Public Perception of Women Farmers through Equal Visual and Verbal Representation

One of the key findings of the current research is that while women's work on farms is visible, their identity as farmers is invisible to their social surroundings [12,28,74,75]. Farming is often seen as a male-dominated profession, and women's roles in agriculture have historically been overlooked or relegated as invisible and less significant background positions [28]. Many government and private sector support schemes and initiatives do not actively represent women farmers in their advertisements [25]. Most of the time, the women farmers' representation is marginalised or ignored altogether, with the exception of advertisements for women-oriented interventions [12,30]. Experts from the field have also highlighted that in public forums, even if women farmers are sitting in large numbers, their presence is not acknowledged. Generally, in these public forums, when referring to farming as a profession, only male farmers are recognised and addressed [25,101].

We suggest visibly representing women farmers in government and private sector initiatives, as it has the potential to challenge deeply rooted gender stereotypes and mental blockages, fostering a more inclusive understanding of farming as a vocation that is suitable for all, regardless of gender [25]. It is crucial to understand the power of representation in shaping perceptions, attitudes, and aspirations. Visual representation plays a pivotal role in constructing societal narratives and has the potential to empower women farmers and drive positive social change (See Figure 1). By visually representing women farmers in banners, posters, and other promotional materials, we aim to achieve a subtle yet significant step towards acknowledging their immense contributions, breaking gender barriers, and promoting inclusivity within the agricultural sector.

Additionally, visual representation can act as a powerful tool for empowerment. When women farmers see their images prominently displayed in banners, posters, and other media, it reinforces their sense of identity and agency [30]. It sends a strong message to women in farming communities that their work is recognised, valued, and respected. This recognition can be transformative, instilling a sense of motivation and encouraging more women to actively participate and take on leadership roles in agriculture. Moreover, visual representation has the potential to sensitise society at large about the multifaceted roles of women in agriculture. By showcasing women farmers in diverse roles, such as landowners, farm managers, decision-makers, scientists, and entrepreneurs, institutions promote a more

nuanced and realistic understanding of their contributions. This, in turn, can positively influence public attitudes and encourage greater support for gender-inclusive agricultural policies and initiatives [102].

Similarly, proactively acknowledging the presence of women farmers in public forums, including their voices, stories, and experiences, can result in better-targeted schemes, enhanced productivity, food security, and sustainable rural development. It is also critical to have women representatives and women farmers present in these forums. These small yet significant changes can have far-reaching effects, as they set the foundation for a more inclusive, diverse, and prosperous agricultural sector in India. This can be a significant step towards gender transformation in agriculture.

### 5.2.2. Gender Sensitisation Training for Stakeholders Working with and for Women Farmers

Women's economic contributions as farmers are invisible in the larger ecosystem, primarily due to the gendered social norms reified in and through conventional practices, along with their limited physical access to productive resources, such as land, credit, technology, knowledge, etc. [28,103]. These norms are internalised and embodied by women and the community members at large, confining women to a set of roles and responsibilities [12]. Nevertheless, the agricultural installation is resilient enough that even with the constraints placed on the material, embodied, and social agency of women, they are able to acquire the required competencies [29]. Despite this, patriarchal norms mean that women are recognised and understood mainly as "housewives" [22] or as extensions of a household, making the women's identity as farmers inconspicuous. Thus, a concerted effort needs to be made by institutions to account for and identify women as farmers rather than as housewives in male-headed households [22].

A varied set of stakeholders on the ground interact with women farmers within the agriculture installation. These include government officials, agriculture researchers, extension service providers, bank officials, etc. Many of these stakeholders hold strong gender and class biases [29]. A pathway to change the mindsets of these stakeholders would be through gender sensitisation training. This will ensure that all the stakeholders better understand the unique needs and experiences of women farmers and help them to develop strategies to support them.

Government schemes and programs should be better designed to meet the needs of women farmers. It is pivotal that such interventions be conducted in a participatory manner through consultation with women farmers themselves—a bottom-up approach [104]. Such training can also help officials identify and overcome their own biases and promote more inclusive policies and practices in different settings, such as Krishi Vigyan Kendra (KVK), along with other agriculture knowledge institutes and training providers, as well as rural banks. Ultimately, gender sensitisation training can help create a more equitable and sustainable agricultural sector that benefits all farmers, regardless of their gender.

In the long run, as India moves towards a more equitable and just society, it is imperative for educational institutions in India to adapt and equip students with the knowledge and skills for gender inclusion. We also propose the introduction of a compulsory course on gender in agriculture within the bachelor's and master's levels in agriculture sciences programs. Integrating a gender-focused curriculum will foster awareness of these disparities and empower students to advocate for gender equality within the agricultural sector. A gender-inclusive curriculum will encourage students to conduct research that accounts for the diverse experiences and needs of both men and women farmers. This approach will lead to more accurate data devoid of a gender data gap in agriculture [12,28] and effective agricultural interventions as these students become agriculture researchers or implementers in the future.

### *5.3. Mainstreaming Women in Agriculture through the Collaboration of a Wide Range of Stakeholders*

Driving social change requires gradual yet consistent capacity building. In this section, we propose several interventions aimed at changing gender biases from within. We explore a range of safe spaces designed to foster the empowerment of women farmers. In doing so, we construct recommendations aimed at improving women's skills, agency, social sense of belonging, and self-perception through various means, such as affiliations with supportive self-help groups. In this section, we claim that such interventions can support women's economic empowerment, ease their process of accessing fundamental productive resources, and even help them in their journey toward obtaining desired land rights.

#### **5.3.1. Understand Women Farmers' Needs and Supporting Them in Building Their Capacity to Meet Their Needs**

Knowledge is power, and as far as women in agriculture are concerned, it has become imperative to create a safe space for learning [29]. Rather than short-term monetary support from some projects, women farmers prefer and identify the importance of skill development and knowledge development and information [105]. In India, the formal agriculture extension system relies on public sector institutions operating at various levels. At the central level, the Ministry of Agriculture and Farmers' Welfare is the key entity. At the state level, State Agricultural Universities and the State Department of Agriculture, Cooperation, and Farmers' Welfare play crucial roles. Moving further down, there are important contributors at the district level, such as the District Department of Agriculture, animal husbandry, horticulture, fisheries, Krishi Vigyan Kendras, and the Agriculture Technology Management Agency (ATMA). In addition to these formal channels, private input companies and smaller fertiliser dealers also play a significant role in providing information to farmers, especially in remote areas where formal extension systems may be lacking. Moreover, various civil society and grassroots organisations across the country are actively involved in agriculture extension activities, further enriching the support available to farmers [106,107]. Over the past thirty years, the field of agriculture extension has experienced a significant transformation. It has shifted away from the traditional top-down "training and visit" approach towards a more decentralised, participatory, and demand-driven method. In order to promote gender inclusion, various national schemes have incorporated specific provisions to support women farmers. For instance, under the ATMA scheme, 30% of the total budget allocation for all ongoing schemes and programs is dedicated to women beneficiaries [108]. Despite these efforts, women's access to extension services still remains limited. For example, from its inception in 2005–06 until December 2018, women accounted for only one-fourth of the total participants in farmer-oriented activities like exposure visits, training, demonstrations, farm schools, and Kisan Melas under the ATMA schemes [53,109].

Capacity-building interventions are critical for women farmers to embody the relevant competencies and knowledge at a similar level to that of their male counterparts. However, they are often unable to partake in such training programs due to their time and work constraints on the farm and at home [29]. Many of these training programs are not designed to meet their needs—for example, they might be organised in distant locations, not conducted in local languages, scheduled at inconvenient hours, or lack female facilitators (a problem highlighted by one of the experts in the included interviews). It is essential to adopt a gender-responsive approach in the design and delivery of capacity-building programs. This approach entails recognising and addressing the specific needs, priorities, and constraints faced by women farmers. It requires involving women in the planning and implementation processes, ensuring their active participation, and promoting their empowerment and leadership within agricultural communities [30]. Experts in the sector suggest making small but significant changes in the workshop or meeting settings, for instance, ensuring that all women are sitting alongside and at the same level as the men. Recruiting more

women facilitators to deliver these training programs and creating a conducive space for young mothers can make a positive difference.

One of the key findings of our study highlighted that women farmers required support with financial decision-making and understanding market dynamics. Financial literacy equips women farmers with essential knowledge about concepts like financial planning, cost-benefit analysis, budgeting, savings, credit, trade, market knowledge [110], and investment and allows them to make informed decisions that positively impact their farming activities. Thus, extension training needs to include financial and business economics as part of their programs.

### 5.3.2. Promote Group Affiliation through Self-Help Groups and Ease the Process of Land Leasing by Group Farmers

Self-help groups (SHGs) in India are community-based organisations that consist of individuals, primarily women, who come together to collectively address their common social, economic, and emotional needs [25]. These groups aim to empower their members by fostering a sense of solidarity, promoting financial independence, and enabling social development. SHGs have been an integral part of India's development strategy, particularly in rural areas, where they have played a significant role in poverty alleviation and women's empowerment. One of the primary objectives of the SHGs is to promote savings amongst their members. Each member regularly contributes a small amount to a common fund, which is then used to provide microcredit or small loans to the members [30]. These loans help members start or expand their small businesses or meet urgent financial needs. SHGs encourage income-generating activities, such as small-scale entrepreneurship, handicrafts, and other vocational initiatives. These activities not only improve the economic status of the members but also contribute to the overall development of the community. A steady and result-oriented momentum has been brought into the Indian agriculture system by working through the self-help group model as far as women in agriculture are concerned. This platform, which is led by women, creates a conducive environment for approaching women directly with agriculture intervention [30]. Drawing on our longitudinal leadership field experience in this area (See Table 1), we strongly recommend promoting group affiliation through self-help groups. Our participant observations in other contexts support the findings we present in this paper, contending that grassroots group participation can bring numerous benefits for participants, such as empowering their vocational identity and sense of efficacy and agency. In the context of women in agriculture, it has been shown that such community based group affiliation can play a significant role in shaping an individual's identity, beliefs, values, and behaviour [101]. By joining self-help groups, women farmers can create a strong support network, share knowledge and resources, share risk, and engage in collective decision-making [30].

Bina Agrawal (2020) [111] criticises governments in developing countries, which often overlook farming as a means to economically empower rural women. The author claims that governmental training programs often offer women farmers alternative vocational trainings rather than enhancing their farming skills. She argues that women farmers' embodied vocational experience as farmers should not be ignored [32]. Her longitudinal study of group farming initiative supported by the UNDP and the local governments in Telangana and Kerala between 2000 and 2005, showed that these initiatives encouraged women to collaborate in cultivating leased land, enabling them to become independent farm managers [111]. Our experience supports her findings [25,30]. We, therefore, strongly recommend that governmental extension programs continue to expand their reach from mainly targeting women involved in family farms to more deliberately focus on promoting group-based alternatives, helping women farmers develop beyond the restrictive confines of their family setup. The success of these interventions requires, however, that local governments assist groups of women in their journey towards obtaining land leases. As discussed above, women face a range of challenges in accessing and owning land due to cultural norms and legal barriers. By legally simplifying the land leasing process for groups

of women, local authorities can further incentivise self-help group affiliation. This will offer, we believe, essential support to women when they take vital steps toward enhancing their status as equal partners in agriculture.

Even with these interventions, in the long run, it is crucial to acknowledge that continuous efforts must be made to ensure that women farmers are provided with equal access to land as their male counterparts. Research suggests that fifteen years after the land-right reform under the Hindu Succession Act in 2005 was implemented, women's access to land has not improved [112]. Experts have indicated in their interviews that promoting the co-ownership of land as a legal reform for transformational change is imperative. However, in the interim, we hope that the suggested interventions can assist in creating incremental change advancing gender equality and empowering women within the agricultural sector.

## 6. Discussion—A Path towards Inclusion and Gender Equality

In this paper, we unpacked the systemic obstructions that women farmers face in their daily work and social interactions within the Indian feminised farming sector. Our findings highlighted the ongoing discrimination women face on the one hand, and their ability to creatively navigate their circumstances, using subtle mundane everyday coping strategies, on the other hand [113,114]. Feminised Indian agriculture is a complex production–consumption system in which women farmers function as the main producers of agricultural outputs as well as the consumers of agricultural inputs, resources, and final yields [115,116]. In this paper, we drew on two main data bodies (see Table 1) to study the Indian feminised agriculture installation. Our findings show that the agricultural installation is not conducive to women farmers, with challenges distributed across all three layers of the installation (i.e., physical, embodied, and social/institutional) [32]. We have shown how women farmers are channelled through the agricultural installation through multilayered physical, cognitive, psychological, and societal structures whilst interacting with multiple stakeholders [32,33]. Crucially, we have shown that women farmers are regularly placed in vulnerable, backstage positions in which their control over or access to fundamental resources is significantly restricted in comparison to their male counterparts as a result of the patriarchal social structure of the sector [79].

Our paper contributes to the emerging theoretical conversation in the field of gender equality within Indian agriculture [4,25,27–29]. Despite the crucial role of women in agriculture and their significant contributions to food security and rural economies, a notable gap in the comprehensive research on women's roles and identities as farmers within the agricultural systems in India has been pointed out [25,26,57]. Addressing this research gap is vital to inform evidence-based policies and interventions that can promote gender equality, rural development, and sustainable agriculture [28,30]. Public perceptions and attitudes towards women farmers are also crucial in shaping policies, support systems, and societal acceptance of their roles in agriculture [117]. Media, including print and digital platforms, plays a significant role in shaping societal perceptions and constructing narratives around various professions, including farming [25,87]. Our study contributes to this emerging conversation in which little attention has been paid to how women's contributions to agriculture are portrayed in the mainstream media. Our 2020 study examined public social perceptions of women farmers as depicted in the media and as presented by the participants in the online story completion task we designed for our data collection. Our findings highlighted the limited knowledge regarding the lives and conditions of women farmers and the gendered expectations that are still prevalent within the Indian public. Our work also illuminated the prevailing gender norms, cultural beliefs, and the insufficient recognition women farmers receive from everyday people and the media [15,22,30]. Our findings also revealed a range of misconceptions and biases that hinder women's access to resources, credit, and markets and how they affect their overall agency and empowerment [21,23,25,28,61,83,103,109]. Creating interventions aimed at bridging the gap in public perceptions can lead to increased support and investment in initiatives targeted at empowering women farmers, as well as more gender-responsive

policies that address the specific needs and challenges faced by women in agriculture, including their food security [42,43,57,77,80,81,118].

Furthermore, in this paper, we responded to recent policymakers' and scholars' calls to shift the focus of research to the investigation of strategies that can promote public awareness and improve the public's perception of women within agriculture and, perhaps even more importantly, to examine ways in which women's self-image and vocational identification as farmers can be empowered [4,25,27–29]. We utilised Installation Theory as a pragmatic, applied theoretical framework that seeks to facilitate change by compartmentalising complex social settings to illuminate and leverage new avenues for intervention [32,33]. Using Installation Theory enabled us to make sense of this extremely complex context. Installation Theory suggests that intervening in any one of these layers has the potential to shift behaviour towards a more sustainable outcome, both in the short and long run [32,33,119–121]. Our analysis of the Indian feminised installation paid careful attention to identifying the critical challenges across the three layers of the installation [33,113]. In doing so, we examined the manner in which the three layers interacted with each other and identified specific leverage points that enabled us to develop relevant interventions that could drive an incremental yet sustainable change within this resistant context [22,30,32,78]. We paid particular attention to the unique challenges and contributions of women farmers and examined the intricacies of their social reality. We identified and outlined targeted strategies, which aimed at improving women's social status, strengthening social networks, improving access to resources, and enhancing the well-being and empowerment of women in agriculture [82,86]. Additionally, our suggestions aimed at drawing attention to and improving the public's awareness of the diverse roles women play in agriculture, thus challenging traditional stereotypes and fostering a more inclusive and equitable agricultural sector in India [22,42]. The recommendations we put forward in this paper provide, we believe, the policymakers, extension personnel, non-profit organisations, donors, and philanthropists invested in engendering the conditions of the women farmers a novel, feasible, pragmatic toolkit that can be developed within each specific regional context to improve gender equality in an incremental, yet consistent and effective manner. Overall, our work will contribute, we hope, to the fostering of a positive shift in societal attitudes toward women farmers, acknowledging and valuing their vital contributions to sustaining rural livelihoods and ensuring food security.

## 7. Conclusions, Limitations, and Recommendations for Future Research

In this paper, we investigated the barriers faced by women farmers in Indian agriculture from a socio-psychological perspective, utilising the framework of Installation Theory [32]. We suggested policies and interventions capable of improving the agricultural installation for the women who play a central role in its operation. We identified essential areas for feasible intervention that could drive the Indian agricultural installation toward a more socially and economically sustainable future (See Figure 1). However, despite the rigour of the research process and the policy implications it contains, the generalisability of its findings within the diverse Indian demography should be qualified [28]. We, therefore, suggest our recommendations be viewed by practitioners as a guiding toolkit that needs to be locally adapted when implemented [78]. For instance, some states in India, such as Kerala, outperform in terms of providing support to female cultivators compared to other states [111].

The struggles of farmers across the world are predicted to aggravate due to climate change [4,8,76,99]. We, therefore, suggest that scholars continue to engage with this important topic. In particular, we recommend that, in addition to further qualitative in-person studies, scholars consider utilising the Subjective Evidence-Based Ethnography (SEBE) methodology as recommended by the Installation Theory [122]. This will allow researchers to not only gain a deeper understanding of the context through the first-hand perspectives of embedded actors but also enable them to observe first-hand the struggles of women farmers as they experience them on the ground [32,78].



Further research should also continue to examine the intersectional dimensions of women's identities, considering factors like caste, class, religion, and region that can significantly influence their agricultural practices and access to resources. Additionally, the exploration of women's farmer agency, decision-making power, and participation in shaping agricultural policies and practices is essential to understanding their evolving roles in the changing agrarian landscape [22,43,77,80,81,83]. In this context, our analyses suggest that more attention can be paid to unpacking women's work overload and burden. In particular, more work can be done to address their care responsibilities, providing on ground solutions and childcare arrangements. Research could also examine aspects like intrinsic or extrinsic aspects of satisfaction for women within the agricultural sector and how these can impact their sense of empowerment, drawing on work that was completed, for example, in the tourism sector [123]. In this context, we recommend that future studies continue to analyse the social networks and support systems available for women farmers in India [22,99]. Social networks play a vital role in shaping women's identities as farmers, influencing their knowledge acquisition, resource access, and decision-making processes [111]. These networks can include informal connections within their families, communities, and village networks, as well as formal structures, such as women's self-help groups and agricultural cooperatives. Understanding the dynamics and effectiveness of these networks can shed light on how information, knowledge, and innovations flow among women farmers, potentially enhancing their productivity and livelihoods [18,23,59,61,106,108]. Moreover, future research should assess the barriers and opportunities for women to engage in collective action, empowering them to advocate for their rights, challenge gender norms, and access supportive resources [30,97].

Furthermore, the Indian media has been intensely politicised in recent years, with both left-wing and right-wing outlets narrating opposing stories [124]. It would be interesting to analyse the portrayal of women farmers and their challenges from both these politicised perspectives and further understand their implications on women's daily lives. Finally, it is crucial to understand that the agrarian crisis in India has affected all genders [9–12,39,40]. While it is essential to ease the constraints within the agriculture installation for women, it is also necessary to address the concerns of the crisis as a whole. Moreover, while this paper focuses on women, future research might explore the functioning of the agricultural installation for all farmers, irrespective of their gender.

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