The University of Manchester
Global Development Institute

Global Development Institute

Working Paper Series

2020-043

April 2020

ISBN: 978-1-912607-01-3

Which women own land in India?
Between divergent data sets, measures and laws

Bina Agarwal[1]

[1] Professor of Development Economics and Environment, Global Development Institute, University of Manchester, UK

Email: bina.india@gmail.com

Pervesh Anthwal[2]

[2] Doctoral Student, Virginia Polytechnic Institute and State University, Blacksburg, USA

Email: perveshanthwal@vt.edu

Malvika Mahesh[3]

[3] Senior Research Analyst, Institute of Economic Growth, University Enclave, Delhi, India.

Email: malvikamahesh@gmail.com

Cite this paper as:

Agarwal, B., Anthwal, R. and Malvika, M. (2020). Which women own land in India? Between divergent data sets, measures and laws. GDI Working Paper 2020-043. Manchester: The University of Manchester.

www.gdi.manchester.ac.uk

Abstract

Accurate figures on gender inequality in land ownership are essential, given their key importance in judging progress on women's economic empowerment, tracing the gap between progressive laws and actual practice, and monitoring SDG 5 on gender equality. Effectively assessing the gender gap in land ownership, however, requires multiple measures which reveal diverse facets. We also need to know *which* women own land and what factors affect a woman's likelihood of doing so. To date, no existing study on India has provided the full range of such assessments, while existing estimates based on national-level data sets are restricted or seriously misleading.

This paper, based on unique longitudinal data collected by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) over 2009-2014, provides estimates of the gender gap in agricultural land ownership in India, using multiple indicators and tracing changes over time and across nine major states. It discusses the drawbacks of existing studies, in particular the substantial inaccuracies in figures provided by a major national survey, NFHS-4, and the limitations of estimates provided by a study based on another national survey, IHDS-II. It also identifies the factors—individual, household and regional—which affect women's likelihood of owning land. Further, using the longitudinal data which covers the same set of households over time, it traces intra-family land transfers.

We find that notwithstanding the 2005 Hindu Succession Amendment Act which granted equal inheritance rights to sons and daughters in joint family property, particularly agricultural land, barely 16% of women in rural landowning households own land, constituting only 14% of all landowners and owning 11% of the land. Equally striking, women are much more likely to acquire land as widows than as daughters, highlighting the divergence between legal reforms which have been strengthening women's rights as daughters and the traditional social legitimacy of widows' claims over daughters' claims. Today, accuracy in estimating this key gender gap in women's economic status is imperative, as is implementing laws to ensure the claims of all women to this vital resource.

Keywords

Gender gap indicators, land owned, data challenges, Inheritance law, India

JEL Codes: Q15, B54, K36

Acknowledgements

We thank the Institute of Economic Growth for logistical support, and acknowledge the International Balzan Foundation's prize research funds awarded to Bina Agarwal and used to cover research assistance and the time of the two early-career co-authors. We are also grateful to Kanika Mahajan and the two anonymous referees of this paper for their helpful comments on an earlier draft.

1 Introduction

Recent decades have seen a growing global recognition, both in academic research and among policymakers and civil society practitioners, that women's ownership of immovable property, especially agricultural land, is a significant determinant of their economic and social status, physical security, and theirs and their family's overall well-being.[1] Ensuring women's equal rights in land is also a key target of Goal 5 for gender equality in the United Nation's Sustainable Development Goals (SDGs) (Agarwal 2018a).

Yet most countries still lack comprehensive country-wide estimates of the gender gap in land ownership. For instance, the database of the Food and Agriculture Organization (FAO), which has been spearheading efforts to collate country-wise gender-specific data on land, shows that while many countries collect data on who *operates* agricultural holdings, only 20 countries report on who *owns* the land by gender (http://www.fao.org/gender-landrights-database/en/). Thirteen of these countries are in sub-Saharan Africa, and very few in Asia, India being a stark absence (see also Kieran et al. 2015).[2] Also, most studies (due either to data or conceptual lacunae) focus on one or two gender inequality indicators, such as what percentage of women own land, or what percentage of landowners are female. But we need a wider range of indicators to cover different aspects of inequality, including details of individual vs. joint ownership; how much land women and men own and of what quality; the characteristics of the landowners; and so on.

Moreover, as countries move towards gender equality in inheritance laws (World Bank 2016), it becomes imperative to monitor whether the laws have narrowed the gender gap in property ownership or been stymied by regressive social norms. Although women can acquire land by various means, such as inheritance, gift, purchase, or government transfers, inheritance is usually the most important, especially in South Asia where land (and especially agricultural land) is largely owned privately,[3] and women are more financially constrained than men in their ability to purchase any. Achieving gender equality in landed property thus depends especially on inheritance laws and their effective implementation. But inheritance laws are often complex, and

[1] See, e.g. Agarwal (1994), Agarwal and Panda (2007), Allendorf (2007), Deere and de Leon (2001), Deere and Doss (2006), FAO (2011), Misra and Sam (2016), Quisumbing and Maluccio (2003), and Sraboni et al. (2014), among others.
[2] India's agricultural census collects gender-disaggregated data only on operational holdings and not on ownership. Not uncommonly, however, people confuse the two and cite figures on operational holdings as if they were ownership holdings (see e.g. figures cited by Saxena 2016 in his report for UN Women India. In turn, he is cited uncritically in an Oxfam India policy brief by Sircar 2016). These incorrect figures spread further through multiple derivative citations.
[3] In the 1990s, 85.6% of arable land in India was privately owned (Agarwal 1994).

capturing their effect empirically can be difficult and requires particular attention to details.

This is especially so for India where inheritance laws vary by religion, region and type of property, with land being treated as a special type of property (Agarwal 1995). Hence, although reforms to promote greater equality in these laws began especially after India's Independence, as with the passing of the Hindu Succession Act (HSA) 1956 for Hindu women, and other reforms among Christians and Parsis, the most significant move occurred in 2005, when the Hindu Succession Amendment Act (HSAA 2005) was passed. This brought for Hindu women, who constitute 80% of women in India, substantial legal equality in all forms of property, including agricultural land, and gave all daughters (married and unmarried) coparcenary rights by birth in paternal joint family property. Prior to this, five states had reformed the original HSA 1956 (Kerala in 1976, Andhra Pradesh in 1986, Tamil Nadu in 1989, and Maharashtra and Karnataka in 1994), but in all except Kerala, which abolished joint family property altogether, the reforms were partial: they applied only to daughters who were unmarried at the time of reform, and where the property had not already been partitioned. Notably too, all the post-Independence reforms strengthened women's rights as daughters (that is, in parental property) rather than their rights as widows or wives (that is, in the husband's property). We would thus expect an increasing proportion of women to acquire land as daughters, especially as coparceners in joint family property. Has this been the case?

The pre-2005 state-level reforms of the HSA 1956 have led to a spate of papers by economists in recent years. They treat the reforms as quasi-natural experiments, and use econometric tools to capture the effects of a legal enhancement in daughters' rights variously on girls' education, female suicides, son preference, women's likelihood of inheriting land, and so on.[4] Their findings diverge: a positive effect on girls' education (Deininger, Goyal and Nagrajan 2013); no effect on girls' education (Bose and Das 2017); an increase in female suicides (Anderson and Genicot 2015) and son preference (Bhalotra, Brule and Roy 2018); a positive effect on the likelihood of daughters inheriting land (Deininger, Goyal and Nagrajan 2013); and no effect on the likelihood of daughters inheriting land (Roy 2015).

Our paper does not seek to evaluate these studies, but four features of India's inheritance law reform, which are relevant to our discussion, have been missed in these discussions and could affect a reading of their results. First, there are likely to be gaps between reforming an existing law and awareness about the exact nature of that reform in the general population, especially given the limited nature of the pre-2005 reforms, and the graded changes in these laws over time.[5]

[4] See, e.g. Deininger, Goyal and Nagrajan (2013); Roy (2015); Anderson and Genicot (2015); Bose (2017); and Bhalotra, Brule and Roy (2018).

[5] Studies on legal awareness are rare, and need great care in execution. For instance, a Landesa/UN Women study (2012), which sought to assess awareness of HSAA 2005 in Andhra Pradesh (AP) and Bihar, did not probe the respondent's awareness of specific elements of legal change, making it difficult to infer which law the respondent was aware (or unaware) of: the

Second, even the unreformed HSA 1956 gave daughters equal rights with sons in a man's 'separate property', if left intestate (i.e. without a will). Separate property included self-acquired property as well as a man's nominal share in joint (coparcenary) family property. To assess the impact of subsequent legal change, we need to know to what extent women come to own property *in line with the change*, namely as coparceners. But without data on the source of inheritance, it is difficult to empirically distinguish between land received by daughters from their father's separate property and that received as their own share in coparcenary property.

Third, enacting a law is unlikely to be sufficient for changing household or individual behaviour and attitudes. Parental resistance in India's patrilineal communities to giving women immovable property as an inheritance share is well-documented (Agarwal 1994, Chowdhry 2017). Hence a change in law, while an important step forward, cannot be assumed, in itself, to change the situation on the ground.

Fourth, in the man's separate property, the widow and mother have long had equal claims with daughters as first order heirs, with the claims of widows having particular social legitimacy. But the direction of reform in post-Independence India has consistently strengthened the rights of daughters at the cost of the deceased man's widow and mother. For instance, introducing daughters as coparceners reduces the father's own coparcenary share, and hence reduces the shares of widows and mothers who have intestate rights in it. Importantly, strengthening daughters' rights at the cost of widows goes contrary to social acceptance and practice in India which have tended to favour widows over daughters (Agarwal 1998). An important reason for this is that Indian women typically move to the husband's home on marriage, so that the paternal family views land given to daughters as passing beyond their control, while widows (and often wives), especially those with sons, are seen as rooted in the marital family and hence entitled to a share in family land (Agarwal 1994, 1998). This is reinforced by rural India's very low divorce rate of under 1% (Dommaraju 2016).

Even under the traditional 12th century Mitakshara and Dayabhaga legal doctrines which broadly governed Hindu inheritance rights till the early 20th century reforms in India,[6] the daughter came only after the widow who, in turn, only had a claim in the husband's joint family property after four generations of males in the male line of descent (Agarwal 1994). Notably too, one of the earliest laws enhancing Hindu women's property rights—The Hindu Women's Right to Property Act, 1937—strengthened only the rights of widows and not of daughters. The Act gave the widow an equal share with the son in the deceased man's separate property. She was also entitled to her husband's share in joint family property when it was partitioned, although

HSA 1956, its amended 1986 version in AP, or the HSAA 2005. The paper also had factual errors on women's rights to property on divorce.

[6] Dayabhaga was restricted to Bengal and Assam (east India) while Mitakshara prevailed in the rest of India. The two systems had much in common but differed somewhat in detail (Agarwal 1994, 1995).

she held only a life interest in it. Daughters' rights were not recognised in this Act: these remained subject to the old Mitaksara and Dayabhaga rules.

This begs the question: have post-Independence legal reforms in India which favour daughters, overturned long-standing social attitudes and practices favouring widows, or have those attitudes and practices remained strong despite legal change. Most importantly, if our concern is with women's empowerment through land ownership (as emphasised by several of the noted papers), we need information on women acquiring land in any capacity, and not only as daughters. Indeed, *in which capacity* women acquire land can notably affect its welfare effects. For example, the literature linking women's asset ownership with children's welfare relates particularly to their ownership as mothers.[7] Knowing how many and which women own land in India is thus essential.

Until recently, there has been a virtual absence of all-India, state-wise data to measure gender differences in land ownership. More recently, two national level surveys, the National Family Health Survey (NFHS-4 for 2015-16) and the Indian Human Development Survey (IHDS-II for 2010-11) included questions on this count. Yet, as will be discussed here, the former is misleadingly unreliable, and the latter is restricted in scope. A third survey—the Rural Economic and Demographic Survey (REDS) conducted by the National Council of Applied Economic Research (NCAER) in 2006—provided data for 16 states on land owned and inherited by gender (Deininger, Goyal and Nagarajan 2013), but it did not cover jointly owned property, or indicate whether the inherited land was from the father's separate property or coparcenary property. The data are also dated and under restricted access.

In this context, longitudinal panel data based on sample surveys of households for several Indian states—from 2010 to 2014 (and for some from 2009–14)—collected by ICRISAT, provides a unique opportunity to widen the scope of measurement and research on Indian women's ownership of landed property. This is the first time that these data have been used for tracing the gender gap in land ownership, although they are used widely for standard agricultural analysis.[8] The data provide us with a new entry point in this debate.

To begin with, they enable us to compare the ICRISAT estimates with existing estimates provided by NFHS-4 and by a study that uses IHDS-II, for a common indicator—the percentage of women who own land in rural landowning households across states. Secondly, we are able to compute several additional indicators of gender inequality in landownership. Existing all-India studies tend to focus on one or two

[7] See e.g. Strauss and Beegle (1996) for India; Thomas (1990, 1994) for Brazil; Quisumbing and Maluccio (2003) for Bangladesh, Indonesia, Ethiopia, and South Africa; Sraboni et al. (2014) for Bangladesh; and Meinzen-Dick et al. (2017) for an overview.

[8] Mullen (2016) in his impact review of ICRISAT village studies lists dozens of papers based on ICRISAT data especially by development economists, most published in international peer-reviewed journals. At its inception in 1975 the ICRISAT data covered 2 villages, which expanded to 6 for 2001-2008. The 2010-14 data covers 30 villages and 8/9 states.

indicators, while globally there is often considerable confusion and non-comparability between studies because of divergence in the measures (Kieran et al. 2015; Doss et al. 2015). But different measures reveal different facets of gender inequality which are important to assess with a single data set, for examining consistency across them. We are able to do so with ICRISAT data.

In addition, we ask: what are the characteristics of the women owning land compared with male landowners and female non-owners? And what is the likelihood of a woman owning land in a landed household, based on her regional, household, and individual characteristics.

In this paper, we thus break new ground on several counts:

First, we assess the parameters of rural women's land ownership in a sample of households across 9 states (the ninth was created in 2014 by splitting Andhra Pradesh into two), and changes in the same set of households over a five-year period, 2010-2014, for all the surveyed states, and over 2009-2014 for five states. We believe this is the first study of a gender gap in landownership in India across so many states that also traces changes over time, based on panel data.

Second, we are able to examine to what extent existing estimates from NFHS-4 and IHDS-II and our estimates from ICRISAT data, diverge or converge, and demonstrate the unreliability of those given by NFHS-4. Since NFHS is used widely for demographic analysis by researchers and policymakers, this demonstration is important to prevent misdirection in research and policy on the issue of women's land ownership, even if other elements of the data may be used for analysis.

Third, we provide several additional indicators on gender inequality in land ownership, including the percentage of rural landed households that have women owners; the proportion of land owned by women individually and jointly as co-sharers; the number of plots, proportion of area owned, and average area owned by female and male landowners; and gender differences in soil quality and irrigation access.

Fourth and most importantly, we examine the characteristics of landowners and analyse for 2014 (the latest year of the survey) and through logistic regressions the likelihood of women owning land, factoring in their personal, household and regional characteristics.

Fifth, we trace whether the women landowners obtained the land from their marital family (as widows or wives), or from their parental family (as daughters). Although this information was not directly collected by the ICRISAT surveys, we were able to use the panel data over several years to reliably track the origins of ownership for a fairly large number of women and make inferences for many others. The range of measures used above also give us a fair idea of deviations from gender-equal laws in practice, and whether the legal strengthening of a daughter's rights has helped overcome the social factors favouring widows over daughters. For instance, if daughters' coparcenary rights

are being recognised, we would expect a fair proportion of households to report co-ownership of landed property with siblings, and/or with fathers.

In specific terms, Section 2 below briefly describes the three data sets (NFHS-4, IHDS-II, and ICRISAT) and compares the estimates for a common indicator across the same states. Section 3 then goes further, using ICRISAT data in depth, to estimate a range of additional indicators of women's land ownership, and changes therein over time and across states/regions. Section 4 outlines the characteristics of the women who own land versus those who do not. It then presents results from our regression analysis which addresses the question: what factors impinge on the likelihood of a woman owning land? The concluding Section 5 reflects on steps forward for further analysis and the data required.

2 Gender and land ownership in India: Divergent data sets and estimates

At the national level, as noted, so far there are existing estimates based on two main sources of data on land ownership by gender: NFHS-4 (2015-16) and IHDS-II (2011-12). Below we briefly describe each, and then outline the third source, ICRISAT, and compare the existing estimates for a common indicator from the two former data sets with our estimates from ICRISAT data.

2.1 National Family Health Survey – 4 (HFHS-4)

NFHS-4, conducted in 2015-16, was the first NFHS to collect gendered data on land ownership (GoI 2017). However, it has several weaknesses. Under the Survey, villages were the Primary Sampling Units (PSUs), but the schedule for land ownership was canvassed only to a sub-sample of 15% of households, with interviews being conducted in every alternate selected household in 30% of the selected villages. In this sub-sample (as is the NFHS practice), only women aged 15-49 and men aged 15-54 are interviewed; hence for land ownership also, details only for these age categories were covered, thus leaving out older family members. Also, NFHS-4 includes all land owned, and does not separate out agricultural land. Nor does it provide information on any other aspect of land ownership which could allow us to assess, say, the percentage of female landowners to all landowners, how much land women and men own, and so on. Most importantly, the sample expansion of NFHS-4 relative to NFHS-3 by some 5.5 times more households,[9] necessitated the recruitment of a large number of new data collectors with limited experience, thus increasing the likelihood of substantial non-sampling errors (personal communication, Dr. Pronab Sen, then Chief Statistician and Head of the National Statistical System, Government of India). These errors could have been compounded for data on landownership by gender which (as noted) was being collected for the first time by the NFHS team.

[9] NFHS-3 covered 109,041 households, and interviewed 124,385 women and 74,369 men (GoI 2008:14), while NFHS-4 covered 601,509 households and interviewed 699,686 women and 112,122 men (GoI 2017:8).

2.2 India Human Development Survey (IHDS)

IHDS is a national survey conducted by the University of Maryland and the NCAER. IHDS-II undertaken in 2011-12 covered 42,152 households in 1420 villages across 384 districts, for all States and Union Territories, except the Andaman and Nicobar Islands and Lakshadweep.[10] In this second round, it also fielded questions on landownership by gender, asking respondents in landed households to 'list the top three' household members who owned any agricultural land.

This data set provides nationally representative figures for agricultural land owned by gender, but it also has several limitations. First, it does not record landholding size by gender. This is a crucial piece of information to assess the magnitude of gender inequality in the area owned. Second, it does not record joint ownership. This limits its scope. Information on joint ownership is important for understanding intra-household gender dynamics, as well as the implementation of laws which give women coparcenary rights in joint family property. In fact, land can be owned jointly with siblings or with the father or uncles as unpartitioned coparcenary, or with spouses in property purchased jointly or given by the government (joint titles for spouses are now the norm in government distributed land in India). As will be seen below in the ICRISAT data we analyse, 114 of the 1114 landowning sample households (10.2%) report having joint owners.

Third, in households with more than three landowners, IHDS-II misses the additional owners. Although the effect of this may be small, since few of its households report even three landowners, what is captured could be biased. The likelihood of women being left out is greater since their rights are less recognised socially. In also creates confusion if more than three persons jointly own a plot. Which three will be reported? Again, a woman co-owner may get excluded by a male respondent.

2.3 The ICRISAT data

The ICRISAT data that we are using for our detailed analysis covers largely the same set of households each year, for the period 2010-2014, for a sample of 30 villages, initially across 8 states and in 2014 across 9 states: Andhra Pradesh (which in 2014 split into Andhra Pradesh "new"[11] and Telangana), and Karnataka in south India; Gujarat, Maharashtra, and Madhya Pradesh in western and central India; and Bihar, Jharkhand and Odisha in eastern India. For five of these states we also have data for 2009. There are small changes in the households surveyed across the years, with a few additions or subtractions.

Although the ICRISAT data covers only nine states, it is a unique data set which helps us trace agricultural land ownership patterns by gender, and changes therein over a five-year period (and for some states over 6 years). It also enables us to identify

[10] Although the data are not statistically representative at the state level, inferences can be drawn, given the large sample size.
[11] We use the suffix 'new' in 2014 to distinguish it from undivided Andhra Pradesh.

individually owned and jointly owned plots by gender, gender differences in area owned and its quality, and the characteristics of the landowners, in ways not covered by previous research. Moreover, since the data relates to the same set of households over five or six years, it is possible to trace some interesting profiles of intra-family shifts in plot ownership, and, for many women, when and from whom they received their plots.

It needs mentioning that over 95% of the sampled landowning households in the ICRISAT data were Hindu and hence subject to the HSAA 2005, which gave daughters legal equality in inheritance with sons. Of the rest, 2.1% were Christians (who also have gender-equal rights in property) and 1.8% were 'others' (all located in Jharkhand state). Muslims constituted only 1.1% of the sample households and these were all located in Karnataka and Maharashtra, none in the other states. Given the low overall incidence of Muslims in the sample, and since most other communities have gender equal inheritance laws, we present the results for the whole sample.

2.4 Comparing estimates across data sets

Here we examine existing estimates and our results on gender inequality in land ownership as measured by the percentage of women owning land in landed rural households:

$$\frac{\text{Women landowners in the relevant age group}}{\text{All women in the relevant age group}} * 100$$

Table 1 gives the NFHS-4 figures for the percentage of rural women and men in the 15-49 age group owning land (individually or jointly). According to these figures, some 28% of women and 49% of men in India own land in landed rural households. Even at first glance the figures for women appear unrealistically high: they are four times higher than those of IHDS-II (discussed further below). Moreover, the regional patterns are contrary to what we may expect both from small studies such as by Chen cited in Agarwal (1998) (Table 2),[12] and from the cultural geographies mapped by Agarwal (1994) which show that women in south India are more likely to own land than those in northwest, central or eastern India. Table 2, for instance, although only indicative, shows that 3% of women in Bihar and 43% in Kerala inherited land as daughters (and 28% and 67% as widows), whereas NFHS-4 shows that 50% of women (in any capacity) in Bihar and 23% in Kerala own land, even though it is Kerala which has historically had a substantial matrilineal population.

[12] The NFHS-4 figures are also contrary to the state-level pattern of female land operators (owners or lessors) found in the agricultural census of 2015-16 (GoI 2018).

Table 1: Inflated figures in NFHS-4
Rural Land Ownership in India by gender, 2015-16

Regions/States	Percentage persons of 15-49 years, owning land alone, or jointly, or both	
	Female	Male
NORTHWEST		
Haryana	27.2	44.1
Himachal Pradesh	8.9	32.8
Jammu and Kashmir	26.9	72.7
Punjab	22.2	25.4
Rajasthan	19.0	43.6
Uttar Pradesh	25.5	50.2
Uttarakhand	21.8	37.9
EAST		
Bihar	49.6	66.7
Chhattisgarh	19.5	43.1
Jharkhand	40.8	70.3
Odisha	46.5	69.2
West Bengal	17.3	49.1
WEST & CENTRAL		
Gujarat	18.8	40.5
Madhya Pradesh	33.2	50.2
Maharashtra	23.0	30.7
SOUTH		
Andhra Pradesh	26.4	48.8
Karnataka	40.1	51.6
Kerala	23.4	35.8
Goa	14.0	24.6
Tamil Nadu	26.6	60.7
Telangana	30.3	48.3
ALL REGIONS	**28.3**	**49.0**

Source: GoI (2017: 560-61), *India Report*, NFHS-4
Note: The north-eastern states are not included in the table, but the All Regions figures, include all states.

Table 2: Rural widows in India who inherited land as daughters and as widows: 1991[1]

Region/state	Cases where father owned land[2]	Women inherited as daughters		Cases where husband owned land	Women inherited as widows	
		No	**%**		**No**	**%**
North India	**229**	**18**	**7.9**	**193**	**98**	**50.8**
Bihar	70	2	2.8	57	16	28.1
Rajasthan	42	2	4.8	39	27	69.2
Uttar Pradesh (hills)	50	1	2.0	45	23	51.1
West Bengal	67	13	19.4	52	32	61.5
South India	**241**	**43**	**17.8**	**87**	**45**	**51.7**
Andhra Pradesh	77	12	15.6	37	18	48.6
Kerala	65	28	43.1	15	10	66.7
Tamil Nadu	99	3	3.0	35	17	48.6
All regions	**470**	**61**	**13.0**	**280**	**143**	**51.1**

Source: Martha Chen, Harvard Kennedy School, 1991 survey, cited in Agarwal (1998:22).
Notes: [1] For all states, other than Kerala, the sample consists only of Hindu widows. In Kerala, it also includes some matrilineal Muslims.
[2] In Kerala the sample also includes cases where the mother owned land, to take account of matrilineal inheritance.

Now consider Table 3 which compares the results for the percentage of women owning land obtained from our ICRISAT data for 2011 and 2014, with those calculated by Lahoti, Suchitra and Swaminathan (2016) using IHDS-II (2010-11), as well as those provided by NFHS-4 (2015-16), for the same states. The studies cover somewhat different age groups, ≥18, ≥15, and 15-49. The IHDS-II computations by Lahoti et al. relate to agricultural land and women who were ≥18 years old. The NFHS -4 figures relate to those in the 15-49 age group and all rural land. We provide ICRISAT figures for both the age categories, ≥18 and ≥15, to enable comparisons as relevant, and (like IHDS-II) relate only to agricultural land.

Table 3: Comparing ICRISAT and existing estimates by data sources Women landowners as a percentage of all women in given age groups in landed households

State/Data source	ICRISAT		IHDS-II[1]	NFHS-4[2]
	2011	2014	2010-11	2015-16
	Agricultural land			All rural land
	1	2	3	4
Age	W ≥ 18 yrs	W ≥ 15 yrs	W≥ 18 yrs	W 15-49 yrs
SOUTH	**17.3 (80/463)**	**19.9 (87/514)**		
Andhra Pradesh	24.0[3] (58/242)	17.7[4] (20/113)	12.1	26.4
Telangana		29.14 (44/151)	—	30.3
Karnataka	9.6 (22/221)	9.2 (23/250)	5.9	40.1
WEST & CENTRAL	**5.9 (45/760)**	**5.8 (47/814)**		
Maharashtra	6.6 (27/412)	7.4 (30/408)	8.8	23.0
Gujarat	4.4 (11/250)	3.8 (11/287)	6.2	18.8
Madhya Pradesh	7.1 (7/98)	5.0 (6/119)	7.9	33.2
EAST	**5.8 (43/739)**	**5.8. 49/848**		
Bihar	8.1 (23/285)	7.7 (25/314)	3.5	49.6
Jharkhand	6.3 (14/221)	6.0 (16/267)	6.7	40.8
Odisha	2.6 (6/233)	3.0 (8/267)	3.4	46.5
ALL REGIONS[5]	**8.6 (168/1962)**	**8.4 (183/2176)**	6.5	28.3

Sources: [1] Lahoti, Suchitra and Swaminathan (2016). [2] GoI (2017: 560-61)
Notes: W= women. [3] Includes Telangana [4] Excludes Telangana.
[5] Includes all states covered in the given data set.

To begin with, we note the relative closeness of our ICRISAT-based estimates and those which Lahoti et al. have calculated from IHDS-II, and the exceedingly high figures of NFHS-4 for all the states compared. Hence in both ICRISAT and IHDS-II estimates, less than 10% women aged ≥18 years own agricultural land in the states of west, central and east India in 2011. In contrast, according to NFHS-4, women landowners in these regions, even for the 15-49 age group, ranged between 19% and 50% of all women in rural landowning households in 2015-16. The comparative ICRISAT figures for 2014 for the ≥15 age groups are between 3% and 8%. Second, we note a consistency in the regional pattern between estimates based on ICRISAT and IHDS-II data and a *reversal* of the regional pattern in NFHS-4 which gives the highest ownership figures for the eastern states rather than the southern states.

Of course, the ICRISAT and IHDS-II figures are for agricultural land, while those for NFHS-4 relate to all rural land, so we may ask: could the higher figures for NFHS-4 be due to women's ownership of non-farm rural land? This appears unlikely. Although neither ICRISAT nor IHDS-II give figures for non-farm land, Swaminathan, et al.'s (2011, 2012) detailed study for Karnataka does so. They covered 4110 households in both rural and urban areas across 8 districts in 2010-11. They found that only 9% of women of ≥18 years in landowning households in rural Karnataka owned agricultural land, relative to 39% of men of ≥18 years of age (2012: 62). If we add to agricultural land the reported real estate land owned by rural women in Swaminathan et al., we still get a figure of only 13% of adult women in Karnataka owning rural land, compared to 47% in NFHS-4.

Also, the NFHS-4 figure relates only to the 15-49 age group and does not include women of ≥50 years. If it did include older persons, its already high figures would have been even higher. For instance, at the all-India level, Lahoti, et al. (2016) report that some 56% of women landowners by the IHDS-II data are ≥50 years old. We get the same percentage from our ICRISAT data. The NFHS-4 figures thus appear to be considerably inflated and unreliable, likely due to the earlier-mentioned non-sampling errors arising from sample expansion with poorly trained investigators. While this national data set is useful on many counts for demographic assessments, the same cannot be said for its figures on landownership by gender. And the IHDS-II data is limited since, as noted, it leaves out landowners beyond the top three, it is unclear on joint owners, and lacks data for computing other measures of the gender gap, to which we now turn.

3 Gender gap in land ownership: Additional measures

We now move to our assessments using only the ICRISAT data. These include several important indicators beyond the percentage of women owning land discussed above. Many of these indicators have not been estimated for India earlier.

3.1 Measuring gender gaps

We use six additional estimates of gender differences in land ownership, all relating to rural households owning agricultural land:

(i) Percentage of households with women landowners
(Households with at least one woman landowner/All rural landed households) * 100

(ii) Percentage of women among all landowners
(Women landowners ≥15 years old/all landowners (male or female) ≥15) * 100

(iii) Proportion of plots owned individually and jointly by gender

(iv) Percentage of household land owned by women
(Total area owned by women/Total area owned by the household) * 100

(v) Average area owned by gender

vi) Quality of land owned by gender

Table 4 gives the percentages of landed rural households which have at least one woman owning agricultural over 2009-2014 by states and regions. In 2014, women owned land in only 16% of landed households across regions, while men owned land in 92% of the households (with some households having both male and female landowners). State-wise, the highest percentage of households with female landowners is in Telangana (44%) and the lowest in Odisha (6%). Comparable figures for men in Telangana and Odisha for 2014 are 82% and 98%. Hence even nine years after the enactment of the HSAA 2005 and almost six decades since the enactment of HSA 1956 which gave women considerable rights in property (even if unequal to men's), we see few households with women owning land in most of these states.

Over time, between 2010-2014, there is a slight upward trend in households with female landowners in several states, but the change is small, and some states, such as Maharashtra, Madhya Pradesh and Gujarat, remain flat or show no consistent pattern, or even a slight decline. The rather little reduction in the gender gap over the years is notable.

Table 4: Percentage of landed households with women landowners in 2009 to 2014 and male landowners in 2014

Region/ State	% HHs with at least 1 woman owning land						% HHs with at least 1 man owning land
	2009	2010	2011	2012	2013	2014	2014
SOUTH	**21.4 (294)**	**22.1 (290)**	**27.2 (290)**	**26.7 (300)**	**29.0 (293)**	**29.0 (297)**	**88.9 (297)**
Andhra Pradesh	28.6 (171)	28.5 (165)	35.6 (163)	33.7 (169)	38.5 (161)	29.4[1] (68)	91.2[1] (68)
Telangana	–	–	–	–	–	43.9 (98)	81.6 (98)
Karnataka	11.4 (123)	13.6 (125)	16.5 (127)	17. 6 (131)	17.4 (132)	17.6 (131)	93.1 (131)
WEST & CENTRAL	**9.0 (409)**	**10.3 (407)**	**10.5 (411)**	**10.8 (407)**	**9.9 (404)**	**10.5 (408)**	**94.8 (408)**
Maharashtra	8.7 (218)	10.0 (219)	11.3 (221)	12.9 (217)	11.5 (217)	11.8 (221)	93.7 (221)
Gujarat	9.2 (131)	10.7 (131)	8.4 (131)	7.7 (130)	8.4 (131)	8.7 (127)	96.1 (127)
Madhya Pradesh	10.0 (60)	10.5 (57)	11.9 (59)	10.0 (60)	7.1 (56)	10.0 (60)	96.7 (60)
EAST	**N/I**	**9.5 (400)**	**10.8 (397)**	**10.6 (406)**	**12.0 (410)**	**12.0 (409)**	**91.4 (409)**
Bihar	N/I	15.6 (128)	18.2 (126)	18.8 (128)	19.8 (131)	18.9 (132)	87.9 (132)
Jharkhand	N/I	9.8 (143)	9.7 (144)	9.5 (147)	12.3 (146)	11.2 (143)	88.8 (143)
Odisha	N/I	3.1 (129)	4.7 (127)	3.8 (131)	3.8 (133)	6.0 (134)	97.8 (134)
TOTAL All regions	**14.2 (703)**	**13.1 (1097)**	**15.0 (1098)**	**15.0 (1113)**	**15.7 (1107)**	**16.0 (1114)**	**92.0 (1114)**

Source: Calculated by the authors from ICRISAT data.
Notes: Figures in brackets give total landed households. [1]Andhra Pradesh excludes Telangana in 2014 but includes it in the pre-2014 period.

A household having even one female landowner is an important indicator (not found in other studies for India), since it reflects a shift away from the social norm of solely male landownership, and familiarises household members with the idea that women can own (and often manage) land. Similarly, community perceptions can change and become more open to women owning land, where a large number of households in the community have women landowners. In this sense, that 44% of Telangana's households in 2014 have landowning women flags an important marker, and also accounts for the notably high proportion of households with women landowners in undivided Andhra Pradesh in previous years.

Next, Table 5 gives female landowners as a percentage of all landowners. Overall, only 14% of all landowners are female. Regionally, we again find the expected south India vs rest-of-India pattern. In 2014, south India did the best overall, with 23% of all landowners being women, while for west & central and east India the figures are 10% and 11% respectively. State-wise, Telangana again has the highest percentage with 32.4 (followed by Andhra Pradesh new), and Odisha the lowest with 5.6. And the upward trend between 2010-2014 is again slight and found mainly in south and east India.

Table 5: Female landowners as a percentage of all landowners in landed households, 2009-2014

State	2009	2010	2011	2012	2013	2014
SOUTH	**18.1 (65/359)**	**18.5 (66/356)**	**21.5 (80/372)**	**21.0 (80/381)**	**20.9 (86/375)**	**23.1 (87/377)**
Andhra Pradesh	23.1 (51/221)	23.3 (49/210)	26.6 (58/218)	25.7 (57/222)	28.9 (63/218)	23.5[1] (20/85)
Telangana	-	-	-	-	-	32.4 (44/136)
Karnataka	10.2 (14/138)	11.6 (17/146)	14.3 (22/154)	14.5 (23/159)	14.6 (23/157)	14.7 (23/156)
WEST & CENTRAL	**8.0 (38/476)**	**9.0 (43/477)**	**9.3 (45/483)**	**10.2 (49/481)**	**9.1 (44/482)**	**9.8 (47/480)**
Maharashtra	7.8 (20/255)	8.9 (23/257)	10.3 (27/263)	12.4 (33/265)	10.7 (29/270)	11.2 (30/268)
Gujarat	7.7 (12/155)	8.9 (14/157)	7.1 (11/154)	6.7 (10/150)	7.3 (11/151)	7.5 (11/146)
Madhya Pradesh	9.1 (6/66)	9.5 (6/63)	10.6 (7/66)	9.1 (6/66)	6.6 (4/61)	9.1 (6/66)
EAST	**-**	**8.9 (38/426)**	**10.0 (43/428)**	**10.0 (43/429)**	**11.2 (49/436)**	**11.3 (49/433)**
Bihar	-	13.7 (20/146)	16.0 (23/144)	16.9 (24/142)	17.7 (26/147)	16.9 (25/148)
Jharkhand	-	9.7 (14/144)	9.7 (14/144)	9.5 (14/147)	12.3 (18/146)	11.2 (16/143)
Odisha	-	2.9 (4/136)	4.3 (6/140)	3.6 (5/140)	3.5 (5/143)	5.6 (8/142)
ALL REGIONS	**12.3 (103/835)**	**11.7 (147/1259)**	**13.1 (168/1283)**	**13.3 (172/1291)**	**13.8 (179/1293)**	**14.2 (183/1290)**

Source: Calculated by the authors from ICRISAT data.
Notes: Measure: women landowners in a state in the ≥15 age group as a percentage of all landowners in the state in the ≥15 age group in landed households. No landowner was found to be <15 years.
Figures in brackets: numerators are women landowners, denominators are all landowners
[1]Excludes Telangana in 2014 but includes it in pre-2014 period.

That Telangana is a bit of an outlier, even among the southern states, is interesting, and could be explained by the long history of government and NGO efforts to help women acquire land in undivided Andhra Pradesh. NT Rama Rao, who was the state's Chief Minister thrice during 1983-1995, for example, was reputed to especially favour policies for empowering women. He introduced a grant-cum-loan scheme in the 1980s for dalit women to buy land in small groups and register it individually. This scheme was used by the Deccan Development Society to promote women's landownership (Agarwal 2003). Notably too, barring Kerala, of the four other states which amended the Hindu Succession Act of 1956 to enhance women's rights, Andhra Pradesh was the first to do so in 1986, and reports emphasize NT Rama Rao's proactive role in this regard (Menon 1984). In the 1990s, similarly, the Andhra Pradesh Mahila Samatha Society worked to economically empower women through a group farming project, launched by UNDP in 2001 in five districts of what is now Telangana (Agarwal 2018b).

3.2 Gender gaps in area and type of land owned

Apart from the gender gap in the incidence of land ownership, it is important to know the extent of difference in the amount and quality of land owned by women and men, since land size and quality directly affect land productivity and associated benefits.

We use plot-wise data to calculate area owned by gender for 2014. Taking all states, the bulk of plots are singly owned (Table 6). In 2014, for example 87.5% of the plots across all 9 states were owned only by one man, 10.2% by one woman, and 2.3% jointly by one or both genders (1% overall were both-gender joint plots). Also, notably, there was no jointly owned plots in the eastern states or in Madhya Pradesh (central India). And this was largely so even in earlier years from 2009. The low levels of jointness across states suggests that rather little land is being held as coparcenary property. It also indicates that the HSAA 2005, whose most important contribution was to recognise the rights of all daughters in joint family property, has had very little impact on this count. In terms of households, too, as noted earlier, only 10% of the 1114 landed households contain both individual and joint plot owners.

From the plot-level data we calculated the amount of land owned by gender in each household. For jointly owned plots, we assumed equal shares. Hence if a one-hectare plot was jointly owned by one woman and two men, each was assumed to own a third, with two-thirds of the plot thus being male-owned and one-third being female-owned.

Table 6: Plots owned individually or jointly by gender, 2014

State		Plot owners (%)					
	Total plots	1 woman	1 man	2 women	≥ 2 men	1 woman and 1 man	> 2 owners of both genders
South							
Andhra Pradesh new	167	13.2	83.2	–	0.6	3.0	–
Telangana	198	22.7	70.7	–	2.0	4.6	–
Karnataka	232	11.2	86.2	–	1.3	0.9	0.4
West & Central							
Maharashtra	447	6.0	86.1	0.89	4.9	1.6	0.4
Gujarat	253	4.7	87.4	–	4.7	1.2	2.0
Madhya Pradesh	129	7.8	92.2	–	–	–	–
East							
Bihar	918	14.2	85.8	–	–	–	–
Jharkhand	618	9.7	90.3	–	–	–	–
Odisha	465	3.7	96.3	–	–	–	–
All	3427	10.2	87.5	0.1	1.2	0.8	0.2

Source: Calculated by the authors from ICRISAT data.
Note: Some households have more than one category of plot.

On this basis we arrive at the figures in Table 7 which relate to 2014 and give state–level and regional averages. We find very high inequalities in the proportions of land owned by women and men. Aggregated across states, women own only 11% of the land. State-wise, the percentages are as low as 3.8 in Odisha and 4.1 in Gujarat. Region-wise, the western, central and eastern states all show women owning less than 13% of the farm land. But even in the best performing state, Telangana, the gender gap is high, with women owning only 21.5% of the land.

The gap is less, however, in the *average* amount of land owned by female and male landowners: both own less than 3 hectares across states (Table 7), the exception being Madhya Pradesh, where the average for women is more than for men. Here only 6 women in the sample own land, of whom two are outliers, including one woman who owns 17 ha. She is the widowed mother-in-law of the household head and has been the household's sole landowner over the 6 years for which we have data.[13]

[13] We tracked her interesting story using information on the family's demographic composition across the years. In a large household of 6 males and 8 females of ≥15 years of age, including her son-in-law's parents, she is the only landowner. She appears to be the family matriarch, supporting the household through the land worked by her son-in-law and other male adults. Her three grandchildren are studying in boarding schools.

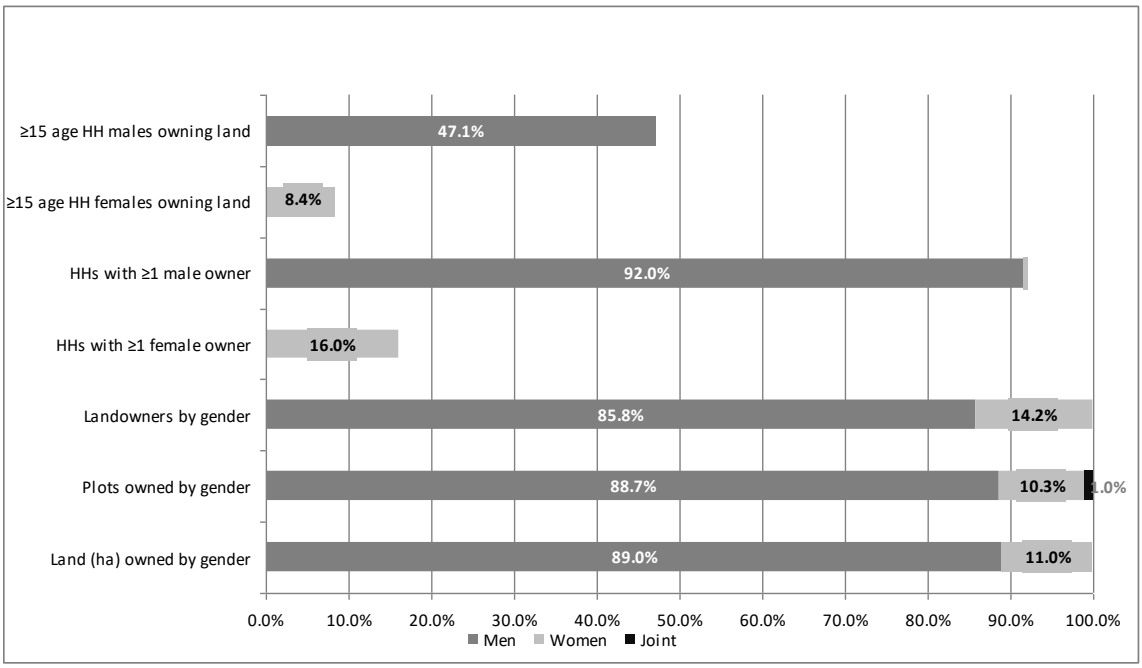
TABLE 7: Percentage of household land and average land owned by gender (Landed rural households, 2014)

Region/State	Total land (hectares)	Percentage land owned		Average land owned (mean hectares)	
		Females	Males	Females	Males
SOUTH	**632.63**	**17.6**	**82.4**	**1.28**	**1.80**
Andhra Pradesh new	115.30	12.4	87.6	0.71	1.55
Telangana	190.62	21.5	78.5	0.93	1.62
Karnataka	326.71	17.1	82.8	2.43	2.03
WEST & CENTRAL	**966.82**	**8.7**	**91.3**	**1.78**	**2.04**
Maharashtra	549.67	9.0	91.0	1.64	2.10
Gujarat	208.58	4.1	95.9	0.78	1.48
Madhya Pradesh	208.57	12.5	87.5	4.34	3.04
EAST	**462.94**	**7.0**	**93.0**	**0.66**	**1.12**
Bihar	160.42	9.8	90.2	0.63	1.18
Jharkhand	123.90	7.8	92.2	0.61	0.90
Odisha	178.62	3.8	96.2	0.85	1.28
ALL REGIONS	**2062.39**	**11.0**	**89.0**	**1.24**	**1.66**

Source: Calculated by the authors from ICRISAT data.
Notes: Measures used: Area owned by women (or men, as relevant) as a percentage of total area in landowning households. For jointly owned plots the gender was known, and the land was divided equally between the joint owners
Land owned by women/number of women landowners; land owned by men/number of male landowners.

Graph 1 helps us to compare gender gaps across the five indicators discussed above in 2014. The gap is substantial on all counts, with the figures for women being under 20% by all the indicators. Just 8.4% of all women in the ≥15 age group own any land, and barely 16% of households have any female landowners. Overall, women constitute only 14% of landowners, owning 10% of the plots and 11% of the agricultural area.

Graph 1: Comparing various measures of gender inequality in land ownership



Source: Based on figures in Tables 3 to 7, calculated by the authors from ICRISAT data.

What kind of land do women own? In the limited land that women do own, gender differences in land quality are minor: about the same percentage of plots (81-82%) owned by both genders are reported to be fertile, and about the same percentage of land (51-52) of both genders is irrigated, although a slightly larger percentage of women's plots have 'problem' soils (7% vs 4% for men).[14] Land quality differences may well occur if there was gender bias in the partitioning of coparcenary land between sons and daughters, but to test that we would need specific data on partitioned property.

4 Landowner characteristics and likelihood of women owning land

4.1 Landowner characteristics

So who are the women who own land in India? What are their personal characteristics in terms of age, education, caste and marital status, compared with female non-owners and male landowners? Table 8 presents the figures for 2014. For some households, on a few counts, information was missing for 2014, but given the panel nature of the data

[14] Studies on soil quality differences between men's and women's fields and their impact are rare. However, a recent study for Malawi in sub-Saharan Africa found notable soil quality differences by gender, and these differences explained 30% of the agricultural productivity gap between male-managed and female-managed plots (Gourley and Kilic 2019). Under customary tenure, in sub-Saharan Africa, women tend to receive specific plots from relatives, whereas in our study the land women own was typically owned and cultivated previously by their husbands.

we could fill in the gaps by tracing the individual backwards in time. In this way, we could construct a full set of characteristics.

We note from Table 8 that both male and female landowners are on average 51–52 years old (the range being 18–85 years for females and 19–94 years for males), and both are on average much older than non-owners. Notably too, some 57% of female owners and 52% of male owners are 50 years of age or over, and in both cases the years of schooling is much lower among owners than non-owners, although it is higher for male than female owners.

TABLE 8: Landowner and non-owner characteristics by gender, (all persons ≥ 15 years in landed households, 2014)

	FEMALES				MALES			
	Owners		Non-owners		Owners		Non-owners	
	No (183)	%	No (1993)	%	No (1107)	%	No (1242)	%
AGE (years)								
Average	52.25		37.54		51.08		28.08	
Range	18 – 85		15-95		19-94		15-94	
AGE CATEGORY (years)								
≥ 15 – <35	8	4.4	1001	50.2	126	11.4	1022	82.3
≥ 35 – <50	71	38.8	510	25.6	409	36.9	152	12.3
≥ 50 – <65	75	41.0	314	15.8	366	33.0	29	2.3
≥ 65	29	15.8	168	8.4	206	18.6	39	3.1
EDUCATION								
Illiterate	108	59.0	728	36.53	297	26.8	79	6.4
Schooling (yrs) mean	2.64	-	5.54	-	5.95	-	9.98	-
CASTE								
Forward caste (FC)	58	31.7	517	25.9	298	26.9	345	27.8
Other Backward Castes (OBCs)	47	25.7	729	36.6	390	35.2	439	35.4
Others	78	42.6	747	37.5	419	37.8	458	36.9
MARITAL STATUS								
Currently married	94	51.4	1517	76.1	1038	93.8	547	44.0
Widowed	84	45.9	115	5.8	46	4.2	21	1.7
Never married, Separated/divorced	5	2.7	361	18.1	23	2.1	674	54.3

Source: Calculated by the authors from ICRISAT data.
Note: Data on education is missing in one case each for female and male non-owners.

The biggest difference between male and female owners, however, is in marital status. A vast proportion (46%) of women owners are widowed relative to only 4% of male owners, most of whom are currently married. Moreover, while 89% of the male owners are household heads, only 41% of women owners become household heads, the rest being mostly wives or mothers of the head (Table 9).

Table 9: Relationship of landowners with household head, 2014

Item	Women	Men
1 Head	41.0 (75)	89.2 (987)
2 Father		3.2 (35)
3 Mother	11.5 (21)	
4 Spouse	40.4 (74)	0.5 (6)
5 Son		5.3 (59)
6 Daughter	1.1 (2)	
8 Daughter-in-law	1.6 (3)	
11 Brother		1.5 (17)
12 Sister	0.6 (1)	
13 Brother's wife	1.6 (3)	
15 Other	2.2 (4)	0.3 (3)
Total landowners	**100.0 (183)**	**100.0 (1107)**

Source: Calculated by the authors from ICRISAT data.

4.2 Regressions: Likelihood of women owning land

We now consider a key question. Given the noted variations in their personal and household characteristics and regional locations, what factors affect the likelihood of a woman owning land? We tested this through three logistic regressions, the first relating to all household members of ≥15 years, using a gender dummy for the gender effect, the second relating solely to female household members of ≥15 years, and the third relating solely to male household members of ≥15 years for comparison.

The equations we compute are as below:

(1) $d_{owner} = \beta_0 + \beta_1 d_{gender} + \beta_2 d_{Mah} + \beta_3 d_{AP} + \beta_4 d_{Kar} + \beta_5 d_{widow} + \beta_{6\,age} + \beta_{7age}^{2} + \beta_{8\,edu} + \beta_{9\,age*edu} + \beta_{10} d_{FC} + \beta_{11} d_{OBC} + \beta_{12\,HH\,persons} + \beta_{13\,HHarea} + \varepsilon$

(2) and (3) $d_{owner} = \beta_0 + \beta_1 d_{Mah} + \beta_2 d_{AP} + \beta_3 d_{Kar} + \beta_4 d_{widow} + \beta_{5\,age} + \beta_{6\,age}^{2} + \beta_{7edu} + \beta_{8\,age*edu} + \beta_9 d_{FC} + \beta_{10} d_{OBC} + \beta_{11\,HH\,persons} + \beta_{12\,HHarea} + \varepsilon$

Where

d_{owner} = dummy for landowners. It relates to all landowners in equation 1, female landowners in equation 2 and male landowners in equation 3

$\beta_2 d_{Mah} + \beta_3 d_{AP} + \beta_4 d_{Kar}$ = state level dummies for Maharashtra, Andhra Pradesh (including Telangana) and Karnataka respectively

$\beta_4 d_{widow}$ = dummy for marital status, widowed = 1

$\beta_{6\,age} + \beta_{7age}^{2}$ = age of member, and age square of member

$\beta_{8\,edu}$ = years of education of member

$\beta_{9\,age*edu}$ = interactive term for age and years of education

$\beta_9 d_{FC} + \beta_{10} d_{OBC}$ = caste dummies

HH persons = number of persons in the household ≥15 years of age

HH area = total area (in hectares) owned by the household

4.2.1 Hypotheses

Regional factors

To begin with, we expect the region/state in which a woman is born to matter. We have already noted that south and west India are more conducive to women getting landed property than north India. The southern states, in particular, have historically been less resistant to women owning land, especially due to social norms governing marriage (Agarwal 2014). For example, in the south, social norms allow marriages within the village and with close kin, such as cross-cousins. Hence land can remain within the parental family's overall purview, unlike in northern India where marriages in the village and to kin are forbidden. Also in the south, social norms allow parents to seek economic help from a married daughter, so that endowing her with land is not an economic write-off, unlike in northwest India where parents are socially disallowed from seeking help from married daughters in times of need. Maharashtra in west India has a mixed pattern in these respects. Perhaps not surprisingly then, the HSA 1956 was first amended, even if partially, in 5 states which are all located in south and west India, before the comprehensive 2005 amendment covered all of India. We test this regional effect with three state dummies for the three states which enacted the pre-2005 legal amendments for which we have data, versus the rest.

Personal characteristics

Second, we can expect the marital status, age, and education level of the landowner to matter. For example, widows are more likely to be landowners than married women, for the reasons already discussed. For males, it could be the opposite since 94% of male landowners (as noted in Table 8) are married. We expect both age and education to be positively related to the likelihood of a person owning land although, on its own, education may not show up as expected, since old or middle-aged people tend to be less schooled. The interactive term measures the joint effect of age and education.

Household characteristics

Third, we include four household-level variables. One is caste. Households have been divided into three categories: forward castes, other backward castes, and lower castes/other communities[15]. The effect of caste could go either way, depending on how gendered social norms play out within each caste. Two, the amount of land the household owns can matter: the larger the area owned the more likely is a woman or a man in that household to own some. Three, we test interchangeably the effect of the number of persons aged ≥15 in the household, and the number of sons aged ≥15 in the household. We expect both variables to reduce the likelihood of a person owning land.

[15] This also contains the few non-Hindu households.

A woman's chances could decrease the more the potential claimants, and especially the more sons the household has who could potentially receive the land owned by the father, either as inheritance or as a gift.

The analysis relates to rural households owning agricultural land.

4.2.2 Regression results

The results, given in Table 10, have some striking features (see appendix tables 1-3 for the descriptive statistics). To begin with, on the gender variable in equation 1, as expected, the probability of men owning land is 37% points greater than that of women owning land, after controlling for other factors.

Equation 2 then directly examines *which* women are more likely to own land in landed households. First, consider regions. Although Andhra Pradesh (including Telangana), as expected, is significant and positively related to women's likelihood of owning land vis-à-vis the eastern and western states, neither Karnataka nor Maharashtra do better than any of the other states or vis-à-vis each other, although both states identically reformed the HSA 1956 to include unmarried daughters as coparceners in joint family property in 1994. If indeed the pre-2005 legal reform was an important factor in increasing women's likelihood of owning land, the marginal effects of Karnataka and Maharashtra would also have been significant, distinguishing them from the non-reformed states.

Second, on women's personal characteristics, widows are found to be significantly more likely to own land than other women (currently married, single, or separated). The probability of widows owing land is 18% points greater than for other women. Widowhood is, in fact, the most important factor affecting a woman's chances of owning land. This observation is reinforced when we probe (further below) in what capacity women received land.

Third, older women are much more likely to be landowners, but this relationship is not linear and tapers off at higher ages (the coefficient of age-square is negatively significant). However, surprisingly, women with more years of education are less likely to be landowners. It appears that age trumps education—older women are less likely to have gone to school. Our age-education interaction term, however, is positively significant, and suggests that older women with some schooling are more likely to own land than the unschooled, but the marginal effect is extremely small.

Table 10: Factors affecting land ownership by gender in landowning rural households (Logistic regressions)

Dependent variable	**Land-owners (Dummy: landowner = 1)**					
Statistical method	Logit					
Population (≥ 15 years)	All household members		Female members		Male members	
Equation no.	1		2		3	
No. of Observations	4523		2175		2348	
Pseudo R^2	0.5673		0.3401		0.5781	
Explanatory variables	**Coef.**	**M.E.**	**Coef.**	**M.E.**	**Coef.**	**M.E.**
Gender of owner (Male=1)	4.23*** (0.00)	0.37*** (0.00)	–	–	–	–
Dummy: Maharashtra =1	0.08 (0.57)	0.005 (0.58)	-0.05 (0.87)	-0.001 (0.87)	0.12 (0.57)	0.02 (0.57)
Dummy: Andhra Pradesh (AP) (including Telangana) = 1	0.80*** (0.00)	0.07*** (0.00)	1.66*** (0.00)	0.06*** (0.00)	0.04 (0.89)	0.01 (0.89)
Dummy: Karnataka = 1	0.28* (0.06)	0.02* (0.09)	0.42 (0.20)	0.01 (0.28)	0.18 (0.39)	0.04 (0.39)
Dummy: If member is widowed =1	1.53*** (0.00)	0.18*** (0.00)	2.75*** (0.00)	0.18*** (0.00)	-1.10** (0.03)	-0.20** (0.03)
Age of member	0.44*** (0.00)	0.03*** (0.00)	0.38*** (0.00)	0.007*** (0.00)	0.43*** (0.00)	0.10*** (0.00)
Age of member squared	-0.004*** (0.00)	-0.000*** (0.00)	-0.004*** (0.00)	-0.000*** (0.00)	-0.004*** (0.00)	-0.001*** (0.00)
Education: number of years	-0.27*** (0.00)	-0.02*** (0.00)	-0.20** (0.02)	-0.004** (0.02)	-0.24*** (0.00)	-0.05*** (0.00)
Interaction term: Education yrs * age yrs	0.005*** (0.00)	0.000*** (0.00)	0.005** (0.01)	0.000** (0.01)	0.005*** (0.00)	0.001*** (0.00)
Dummy: Forward castes =1	-0.10 (0.39)	-0.007 (0.38)	0.55** (0.01)	0.01** (0.05)	-0.46** (0.007)	-0.10** (0.005)
Dummy: Other Backward Castes = 1	-0.18 (0.10)	-0.01 (0.10)	0.21 (0.43)	0.004 (0.45)	-0.34** (0.03)	-0.08** (0.02)
Total household land (hectares)	0.14*** (0.00)	0.01*** (0.00)	0.10*** (0.00)	0.002** (0.005)	0.18*** (0.00)	0.04*** (0.00)
No. of household members ≥15 years of age	-0.38*** (0.00)	-0.02*** (0.00)	-0.09 (0.16)	-0.002 (0.19)	-0.50*** (0.00)	-0.11*** (0.00)
Constant	-12.65 (0.00)	–	-12.06*** (0.00)	–	-8.14*** (0.00)	–

Source: Calculated by the authors from ICRISAT data.
Notes: numbers in parenthesis are *p*-values. M.E = Marginal Effect. Significance: *10%; **5%; ***1 %
Andhra Pradesh new and Telangana are aggregated under Andhra Pradesh (AP)
The equations include both individual and household characteristics, with standard errors corrected for clustering within the household.

Differences between state dummies
Eqns 1, 2: Differences between AP and Maharashtra and AP and Karnataka were significant at 1% and 5% respectively. Maharashtra and Karanataka were not significantly different.
Eqn 3: None of the three state dummies included were significantly different from each other.

Differences between caste dummies
Eqns 1, 2 and 3: The two caste dummies included were not significantly different from each other.

Fourth, in terms of household characteristics, interestingly the likelihood of a woman owning land is higher in forward caste households relative to both OBCs and other castes. Women are also more likely to own land in households owning more area, but are unaffected by the number of ≥15 year olds in the household. We found that substituting the number of all ≥15 year olds by the number of ≥15 year old sons did not affect the results.

Equation 3 for males provides an interesting contrast to females on several counts. To begin with, none of the state variables are significant, reinforcing the argument that cultural geographies that affect women's landownership affect men rather little. Male landowners are as likely to be found in south India as in other parts of the country. Also the marital status and caste results for men are the opposite to those for women. Few landowners, as noted, tend to be widowed; and men among forward castes and OBCs are found less likely to own land compared with other castes/communities.

On other counts, however, the results for men are similar to those for women. Older men (like older women) are more likely to own land. Indeed, age is one of the important factors increasing a man's chances of being a landowner, but the relationship is non-linear. Also (as with women), better schooled men are less likely to own land, but the age-education interaction term is again positive and significant, hence education matters beyond being elderly, although the marginal effect is very small. Men are again more likely to own land in households with larger amounts of total household land, but significantly less likely to be landowners in households with a larger number of ≥15 year olds.

4.3 Further on women landowners

Given the noted importance of marital relationships in determining women's likelihood of being a landowner, we decided to probe further the sources and relationships through which the women landowners had acquired their land.

Although the ICRISAT data does not provide direct information on this count, some creative reconstruction was possible by tracing backwards from 2014, since we have information on who owned which plots in each year since 2009/2010. In this way, we could ascertain for a fair number of the 183 women landowners in 2014, at what point they became landowners. Using this method, we can reliably say that in 37.5% of the cases women received the land from husbands (mostly as widows, but in some cases also as wives with living husbands transferring some plots to them, or via joint purchase). As an example, where in the previous year the landowner was male and in the current year he was found to have died and his widow was listed as the owner of his plots, we could reliably assume that she had received the land as a widow. In another 15.7% cases we could infer that the women received the land through their marital families (e.g. as the widowed mother of the household head, or co-owners with sons, or co-owner with the mother-in-law). Together, this covers 53.2% of our female landowners. In a number of cases no inference was possible where the woman had acquired the land before 2009/10 (the earliest years of our data). Notably though, in

barely 16 cases (9%) was it stated that the women had received the plots as gifts (although the source of the gift was not given), or through family partition, or (in 3 cases) via inheritance as daughters or sisters.

Hence, the most common relationship under which women become landowners is as widows. After the husband's death his plots pass to his widow, and in many cases so does the headship (41% of women landowners in our sample are also household heads). We had observed earlier that 46% of our female landowners in 2014 were widows. Lahoti et al. (2016:18) in their analysis of IHDS-II data had found an even higher figure, namely that 56% of female landowners were widows. It is telling that women continue to be more likely to receive land as widows rather than as daughters, despite the substantial advancement of women's legal rights as daughters. Notably, in most of the households with women landowners, there were daughters and/or sons of ≥15 years of age, who under the HSAA 2005 have a claim in their father's separate property and also directly in joint family property. Yet only in some cases did the son also own land, and none of the daughters owned any.

Although, in overall terms, women's rights as both widows and daughters are precarious and strongly circumscribed by social norms and prejudices, widows' rights have always enjoyed greater legitimacy than daughters' rights (as we had noted in the introduction). In the 1980s, for instance, it was found, especially in northwest India, that officials who registered inheritance shares tended to pressure daughters to sign away their shares in favour of their brothers, while persuading widows to keep their shares (Agarwal 1998). Surveys in the 1990s also showed that widows' claims were registered in a fair proportion of cases, albeit usually jointly with their sons; this was not the case with daughters' claims (Nandwana and Nadwana 1998, Agarwal 1998). Table 2 also strikingly brings out this difference. Only 13% of the widows with landowning fathers inherited land as daughters, while 51% of those with landowning husbands inherited as widows. Even in Kerala, the claims of widows, in aggregate, were better recognised than those of daughters. Several decades since then, and despite inheritance law reform, this pattern does not appear to have changed noticeably. This also implies that most Indian women lack landed assets at a time in their life cycle when ownership could especially enhance their intra-family bargaining power, namely when they are still married.

5 Concluding reflections

Using ICRISAT's unique longitudinal data set for the same set of households over 2009-2014, this paper provides the first estimates of the gender gap in land ownership in India which cover a wide range of indicators across 9 major states, and changes over time for 8 states. It demonstrates the unreliability of the figures provided by a major national survey NFHS-4, and the limitations of existing estimates based on another national survey, IHDS-II. It also examines what factors—individual, household and regional—impinge on a women's chances of owning land. In so doing, it addresses the little-addressed question: *which* women own land in India?

We find that despite significant advances in inheritance law towards gender equality, the situation on the ground is dismal, with very substantial inequalities by all the indicators. Regionally we find the expected pattern, with a larger proportion of women owning land in south India than in the west or east, but even in the best performing states—Telangana and Andhra Pradesh new—there is substantial gender inequality, with only 32% and 24% respectively of the landowners being women in 2014. And the regional pattern is found to have remained largely unchanged over the six year period—2009 to 2014—that we have examined.

It is also striking that most of the landowning women have acquired their land through their marital families, especially as widows, and not through their paternal families, despite being given equal coparcenary rights with brothers in joint family property under the HSAA 2005. Only 2.3% of plots are owned jointly, and none are found to be owned jointly in the eastern and central states. If indeed coparcenary rights had been recognised by families after the 2005 amendment of the HSA, we would have expected many more cases of joint ownership across states.

Our regression analysis similarly points to the importance of widowhood, age and regional location in enhancing the likelihood of women owning land, widowhood being the most important. Widows and older women in general have an advantage, and this advantage is greater if they are located in households owning more land and are also based in Telangana or Andhra Pradesh new.

For the future, much more needs to be done both in terms of data gathering and policy implementation. Although the ICRISAT data has many unique advantages, especially in tracing the same households over time and for multiple indicators, we still need a data set which is representative nationally and covering all states. If this is gathered through the next round of the NFHS, then great care will be needed in the design and implementation of the questionnaire which deals with land ownership, and the data collectors will need special training to ensure accuracy. Otherwise, we may end up with another set of unreliable data on landownership as gathered in NFHS-4. Other potential sources from which such data could be generated in India by introducing gender-disaggregation are the Agricultural Census and the National Sample Surveys, both of which gather land ownership data, but not by gender.

In terms of policy, much more clearly needs to be done to improve women's property position as daughters, if India is to move at all towards gender equality in landownership, as also targeted in SDG 5. This remains a significant challenge in the face of rigid social norms and perceptions.

References

Agarwal, B. 1994. *A field of one's own: Gender and land rights in South Asia.* Cambridge: Cambridge University Press.

Agarwal, B. 1995. Women's legal rights in agricultural land, *Economic and Political Weekly,* March, 25: 39-56.

Agarwal, B. 1998. Widows vs. daughters and widows as daughters: Property, land and economic security in rural India', *Modern Asian Studies*, 32 (1): 1-48.

Agarwal, B. 2003. Gender and land rights revisited: Exploring new prospects via the State, family and market, *Journal of Agrarian Change*, 3 (1&2): 184-224.

Agarwal, B. 2018a. Gender inequality, food security and sustainable development goals, *Current Opinion in Environmental Sustainability*, 34: 26-32.

Agarwal, B. 2018b. Can group farms outperform individual family farms? *World Development*, 108: 57-73.

Agarwal, B. and P. Panda. 2007. Toward freedom from domestic violence: The neglected obvious, *Journal of Human Development*, 8(3): 359-88, 2007.

Allendorf, K. 2007. Do Women's land rights promote empowerment and child health in Nepal? *World Development*, 35 (11): 1975-1988.

Anderson, S. and Genicot, G. 2015. 'Suicide and property eights in India', *Journal of Development Economics*, 114: 64-78.

Bhalotra, S. Brule, R. and Roy, R. 2018. Women's inheritance rights reform and the preference for sons in India, *Journal of Development Economics*, https://doi.org/10.1016/j.jdeveco.2018.08.001 accessed on 9 April 2020

Bose N. and Das, S. 2017. Women's inheritance rights, household allocation, and gender bias, *American Economic Review: Papers & Proceedings,* 107(5): 150–153 https://www.aeaweb.org/articles?id=10.1257/aer.p20171128 accessed on 9 April 2020.

Chowdhry, P. (ed.) 2017. *Women's land rights: Gender discrimination in ownership* (Land Reforms in India series). New Delhi: Sage Publications.

Deere, C.D. and Doss C.R. 2006. The gender asset gap: What do we know and why does it matter? *Feminist Economics*, 12:1–50.

Deere, C. D., & Leon, M. 2001. *Empowering women: Land and property rights in Latin America*. Pittsburgh: University of Pittsburgh Press.

Deninger, K., Goyal, A. and Nagarajan, H. 2013. 'Women's inheritance rights and intergenerational transmission of resources in India', *The Journal of Human Resources*, 48(1): 114-141.

Dommaraju, P. 2016. Divorce and separation in India, *Population and Development Review*, 42(2): 195-223.

Doss, C., Kovarik, C., Peterman, A., Quisumbing, A. and van den Bold, M. 2015. Gender inequalities in ownership and control of land in Africa: Myth and reality, *Agricultural Economics*, 46: 403-434.

FAO. 2011. *The State of food and agriculture*. Rome: FAO.

GoI. 2008. *National Family Health Survey* (NFHS-3), 2005-06. International Institute for Population Sciences, Ministry of Health and Family Welfare. Mumbai: Government of India.

GoI. 2017. *National Family Health Survey* (NFHS-4), 2015-16. International Institute for Population Sciences, Ministry of Health and Family Welfare. Mumbai: Government of India.

GoI. 2018. *All India report on number and area of operational holdings,* Agriculture Census Division, Department of Agriculture, Co-operation & Farmers Welfare. Delhi: Government of India.

Gourley, S. and Kilic, T. 2019. *Explaining the gender gap in agricultural productivity in Malawi: The role of soil quality*, draft paper, Development Data Group, World Bank, Washington D.C.

Kieran, C., Sproule, K., Doss, C., Quisumbing, A., Kim, S.M. 2015. Examining gender inequalities in land rights indicators in Asia, *Agricultural Economics*, suppl. 46: 119–138.

Lahoti, R., Suchitra, J. Y. and Swaminathan, H. 2016. Not in her name: Women's property ownership in India, *Economic & Political Weekly*, 51(5): 17-19.

Meinzen-Dick, R.M., Quisumbing, A., Doss, C., Theis, S. 2017. Women's land rights as a pathway to poverty reduction: Framework and review of available evidence, *Agricultural Systems*.

Menon, A.K. 1984. Andhra Pradesh Chief Minister N.T. Rama Rao seeks to give women equal share in paternal property, *India Today*, August 15.

Misra, K. and Sam, A. G. 2016. Does women's land ownership promote their empowerment? Empirical evidence from Nepal, *World Development,* 78: 360–371.

Mullen, J. D. 2016. *Impact of assessment of ICRISAT village level studies: 1975-2013*, Patancharu: ICRISAT.

Nandwana, R. and Nandwana, S. 1998. Land rights of widows in Rajasthan, in M. Chen (ed). *Widows in India*, New Delhi: Sage.

Quisumbing, A.R. and Maluccio, J. A. 2003. Intrahousehold allocation and gender relations: New empirical evidence from four developing countries in A. Quisumbing (edited) in *Household decisions, gender and development, a synthesis of recent research*: Washington DC: IFPRI.

Roy, S. 2015. Empowering women? Inheritance rights, female education and dowry payments in India, *Journal of Development Resources*, 114: 231-251.

Saxena, N.C. 2012. *Women, land and agriculture in rural India*. New Delhi: UN Women.

Sircar, A. 2016. Women's right to agricultural land removing legal barriers for achieving gender equality, Oxfam India Policy Brief, Delhi.

Sraboni, E., Malapit, H., Quisumbing, A.R. and Ahmed, A. 2014. Women's empowerment in agriculture: What role for food security in Bangladesh? *World Development*, 61: 11-52.

Strauss, J. and Beegle, K.1996. Intrahousehold allocations: A review of theories, empirical evidence and policy issues. MSU International Development Working Paper No. 62, Dept. of Agricultural Economics, Michigan State University, East Lansing.

Swaminathan, H., Suchitra, J. Y. and Lahoti, R. 2011. Karnataka gender asset survey: Measuring the gender asset gap, KHAS, Indian Institute of Management, Bangalore.

Swaminathan, H., Lahoti, R. and Suchitra, J.Y. 2012. Gender asset and wealth gaps: Evidence from Karnataka, *Economic & Political Weekly,* 47(35): 59-67.

Thomas, D. 1990. Intra-household resource allocation: An inferential approach. *Journal of Human Resources*, 25 (4): 635-663.

Thomas, D. 1994. Like father like son, or, like mother like daughter: Parental education and child health. *Journal of Human Resources*, 29 (4): 950-988.

World Bank. 2016. *Women, business and the law*. Washington DC: World Bank.

Appendix

Appendix Table 1: Descriptive statistics for variables in regression equation 1

Variable	N	Mean	CV	Min	Max
Dummy: household members (owner = 1)	4525	0.29	1.58	0	1
Dummy: Gender of members (Male = 1)	4525	0.52	0.96	0	1
Dummy: Maharashtra = 1	4525	0.19	2.07	0	1
Dummy: Andhra Pradesh new and Telangana =1	4525	0.12	2.69	0	1
Dummy: Karnataka=1	4525	0.11	2.78	0	1
Dummy: marital status, widowed=1	4525	0.06	4.00	0	1
Age of member (years)	4525	38.85	0.44	15	95
Age of member (years) square	4525	1797.75	0.84	225	9025
Years of education of member	4523	6.74	0.78	0	23
Interaction term: years of education * age of member	4523	216.71	0.87	0	1422
Dummy: Forward castes =1	4525	0.27	1.65	0	1
Dummy: Other Backward Castes (OBCs) =1	4525	0.35	1.35	0	1
Characteristics of household-level variables used in all three equations					
Total land owned in the household (ha)	1114	1.85	1.33	0.008	26.71
Number of persons of ≥15 years in the household	1114	4.06	0.46	1	17
Number of sons ≥15 years of age in the household	1114	0.95	0.98	0	5

Source: Calculated by the authors from ICRISAT data.
Notes: N= number of observations; cv = coefficient of variation

Appendix Table 2: Descriptive statistics for variables in regression equation 2

Variable	N	Mean	CV	Min	Max
Dummy: Female household members (Owner = 1)	2176	0.08	3.30	0	1
Dummy: Maharashtra = 1	2176	0.19	2.08	0	1
Dummy: Andhra Pradesh new and Telangana =1	2176	0.12	2.69	0	1
Dummy: Karnataka=1	2176	0.11	2.78	0	1
Dummy: marital status, widowed=1	2176	0.09	3.15	0	1
Age of member (years)	2176	38.78	0.43	15	95
Age of member (years) square	2176	1785.10	0.83	225	9025
Years of education of member	2175	5.30	0.95	0	20
Interaction term: years of education * age of member	2175	155.07	0.98	0	960
Dummy: Forward castes =1	2176	0.26	1.67	0	1
Dummy: OBCs =1	2176	0.36	1.34	0	1

Source: Calculated by the authors from ICRISAT data.

Appendix Table 3: Descriptive statistics for variables in regression equation 3

Variable	N	Mean	CV	Min	Max
Dummy: Male household member (Owner=1)	2349	0.47	1.06	0	1
Dummy: Maharashtra=1	2349	0.19	2.06	0	1
Dummy: Andhra Pradesh new and Telangana =1	2349	0.12	2.69	0	1
Dummy: marital status, widowed=1	2349	0.03	5.84	0	1
Dummy: Karnataka=1	2349	0.11	2.79	0	1
Age of member (years)	2349	38.92	0.44	15	94
Age of member (years) square	2349	1809.47	0.85	225	8836
Years of education of member	2348	8.08	0.63	0	23
Interaction term: years of education * age of member	2348	273.80	0.73	0	1422
Dummy: Forward castes =1	2349	0.27	1.63	0	1
Dummy: OBCs =1	2349	0.35	1.35	0	1

Source: Calculated by the authors from ICRISAT data.