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The tail inside the average

Why farm-gate governance that passes for India's states fails at its tail, and how a recursive test finds where

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FOR MINISTRIES, STATE AGRICULTURE DEPARTMENTS, INSURERS, FUNDERS AND SCHOLARS

ABSTRACT

India judges farm policy by averages, and averages hide its failures. This working paper applies the Tail-End Diagnostic to the farm gate, using the National Sample Survey's Situation Assessment of Agricultural Households for 2018-19 (58,040 households, 36 states), and tests six credits: whether farmers know the minimum support price and the agency that procures at it, whether they know crop insurance, whether they sold to a procurement agency, whether they belong to a farmers' organization, and whether their sales gave them grounds for grievance. The tail is treated as relative and recursive: holdings of no more than 10 acres, then the tip of 1 hectare or less, then Scheduled Tribe, Scheduled Caste, women-headed, and tenant households within that tip. Of 30 state verdicts that pass on average, 13 are overturned at the tail, 11 of them by gaps of at least 5 percentage points, and 228 of 1,017 tests fail where about 51 would by chance. Scheduled Tribe households in the tip are most often where the deepest failure lies. In Chhattisgarh, 71.5 percent of farm households know the minimum support price; among Scheduled Tribe households in the 1-hectare tip, 50 percent do, versus 81 percent for the rest of the tip. The gap recurs at every level of the tail and is largest at the first split. The paper argues that a state's success should be judged by how far down its tail it reaches, and it shows how to test that with data the state already collects.

KEYWORDS

minimum support price; crop insurance; smallholders; Scheduled Tribes; recursive tail; NSS 77th Round; governance diagnostic; India

INTERACTIVE MAP

The tail inside the average: interactive map

SUGGESTED CITATION

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Argument

An average is a verdict about a population that no single household lives in. When a state reports that seven in ten farmers know the minimum support price, it reports a fact about its farmers in aggregate and nothing about the farmer who matters most for whether the policy is working: the one at the tail end of the distribution, with the smallest holding, the least recorded tenure, and the fewest channels to the office that fixes the rule.

This paper makes three claims. First, farm-gate governance that passes on average in India's states very often fails at the tail; the failure is not occasional noise but a pattern several times larger than chance would produce. Second, the tail is not one group but a nest of them, and the nest matters: verdicts that survive a test of smallholders collapse at the tip, and verdicts that survive the tip collapse for Scheduled Tribe households inside it. Third, the instruments to see this already exist. The state collects the data, publishes the averages, and leaves the tail unread.

1

The recursive tail

The tail is relative. A smallholder is at the tail of all farm households and at the head of the landless; a household with one hectare is at the tail of smallholders and at the head of those with half as much. A test that fixes one tail and stops will always find someone further down whom it did not see. The Diagnostic therefore tests at every split, and each split has a frame, a tail, and a head.

LEVEL	FRAME	TAIL	HEAD
1	All agricultural households	Area operated no more than 10 acres	More than 10 acres
2	The level 1 tail	The tip: 1 hectare or less	Over 1 hectare and up to 10 acres
3	The tip	Scheduled Tribe; Scheduled Caste; women-headed; tenant, each separately	The rest of the tip

The first bound comes from published fieldwork in Telangana, where the exposure unit was defined as a coupled smallholder system of no more than 10 acres (Ramprasad 2018, *Journal of Peasant Studies*). At each split, the tail is tested twice: against its own frame, which is the Tail-End Standard's definition of parity, and against its head, because a tail that makes up most of its frame sits mechanically close to the frame's average and can hide a large gap from the households above it. A credit fails if any testable split fails, and the deepest failing level is reported, because that is where the shadow is deepest.

2

The record

The data are the unit-level records of the National Sample Survey's 77th Round, Schedule 33.1, collected in two visits across 2018-19 and released by the Ministry of Statistics and Programme Implementation. Before computing any tail statistic, the analysis reproduced the published figures from the survey's own report (NSS Report No. 587) from the unit records, which fixed the denominators and survey weights.

FIGURE (PADDY, JULY TO DECEMBER 2018)	REPORT 587	UNIT RECORDS
Aware of MSP, among households selling	40.7	40.8
Aware of the procurement agency	30.3	30.3
Sold to the procurement agency	14.5	14.6
Crop-producing households insuring	8.3	8.3
Insured households with insurance documents	34.1	34.1
Self-insured households with a crop loss	38.0	38.0
Claim received fully, partly, not at all	7.9, 19.0, 73.1	7.9, 19.0, 73.1

The design was registered and checksummed before the run, and six implementation choices left open by the registration were logged before any results were available. States are the unit because states administer procurement and crop insurance. Tests use a two-stage cluster bootstrap within each state, resampling first-stage units and then households 1,000 times, with 90 percent intervals. A group is tested only where it has at least 100 sample households in at least 20 first-stage units.

3

Six credits at the farm gate

The credits follow the Tail-End Standard's core. Knowing the minimum support price and the agency that procures at it is the position rule at the farm gate (C6): the state publishes the basis on which it will pay, and the question is whether it reaches the people it binds. Knowing crop insurance is the same test for a second rule. Selling to a procurement agency is receipt (C8). Membership of a registered farmers' organization is entry into a collective that can speak to the rule (C5). Sales that ended below the market price, with delayed payment, with deductions, or with faulty weighing are grounds for grievance (C7), where a lower share is better. Access to technical advice is reported, not scored, as a reading of the information shadow.

4

Verdicts overturned

Judged on the average, 30 state-credit cells pass. The recursive test overturns 13 of them. Ignoring failures where the gap is smaller than 5 percentage points, 11 of 30 remain overturned; the two that fall away, agency awareness in Punjab and insurance awareness in Kerala, failed only at the first split, where the tail accounts for most of the frame and precise estimates register trivial gaps. Across all 1,017 tests, 228 fail; about 51 would fail by chance.

Chhattisgarh shows the whole mechanism in one state. Its farm households know the minimum support price at 71.5 percent, its procurement agency at 67.9 percent, and crop insurance at 63.0 percent, and, on average, all three pass. Among Scheduled Tribe households in the 1-hectare tip, the shares are 50, 44, and 35 percent, against 81, 79, and 72 percent for the rest of the tip. Maharashtra's insurance awareness fails at every level of the nest: 58 percent against 80 percent at the 10-acre split, 51 percent against 67 percent in the tip, and 27 percent against 56 percent for Scheduled Tribe households within it. In Haryana, minimum support price awareness passes at 63.6 percent and falls to 52 percent in the tip, against 73 percent for holdings between 1 hectare and 10 acres. In Assam, 60 percent of Scheduled Caste households in the tip report grounds for a sale grievance, against 31 percent for the rest of the tip.

Two of the 13 overturns, minimum support price awareness in Tripura and sale grievance in Assam, appear only at the third level. A test that pooled the tip would have passed them.

5

Down the tail

Across states, the median gap between tail and head recurs at every level of the nest.

CREDIT (MEDIAN GAP, POINTS)	10 ACRES	1 HA TIP	ST IN TIP	WOMEN-HEADED IN TIP	SC IN TIP	TENANT IN TIP
Aware of MSP	−44.2	−12.4	−12.6	−8.7	+7.0	+4.2
Aware of procurement agency	−34.1	−10.4	−6.9	−6.0	−1.2	+2.0
Crop insurance known	−8.3	−8.1	−5.9	−2.6	−1.4	−1.0
Sold to procurement agency	−19.8	−4.5	−3.7	+2.0	−0.8	0.0
Technical advice accessed	−19.2	−9.6	−5.9	−6.1	−4.2	+3.3

The pattern is self-similar but shrinking. The largest gap opens at the first split, between holdings above and below 10 acres; the tip then opens a fresh gap of 4.5 to 12.4 points on five of the credits, and Scheduled Tribe households in the tip open another of 3.7 to 12.6. Scheduled Caste and tenant households in the tip are not consistently worse on awareness than the rest of the tip, and the paper reports that as it stands.

Scheduled Tribe households in the tip are the deepest failing level in 18 state-credit cells, more than any group other than the tip itself (31). These figures come from public, open data: the National Sample Survey that the Ministry of Statistics and Programme Implementation collected and released, aggregated to states. They count state-credit cells, not households, and they describe 2018-19. States such as these show the pattern. In Chhattisgarh, 50 percent of Scheduled Tribe households in the tip know the minimum support price, against 81 percent for the rest of the tip. In Maharashtra, 27 percent know crop insurance, against 56 percent. In Tripura, 35 percent know the minimum support price, against 62 percent.

What would overturn this finding is stated in advance. Any one of the following would: a larger sample of the tip in which the interval no longer lies below zero; awareness measured by a direct test rather than self-report showing no gap; a later survey round, after the changes to procurement and crop insurance since 2018-19, in which the gap has closed; or the gap disappearing once holding size and irrigation within the tip are held constant, which would locate the disadvantage in land rather than in position.

6

What fails everyone

Some credits fail at the average and leave the tail test nothing to overturn. Selling to a procurement agency averaged 11.3 percent across the 21 states tested; membership of a registered farmers' organization averaged 5.3 percent across 26. Where the rule fails for nearly everyone, the tail-end test is silent, and the rating says so.

The national record also shows what the state misses. Among paddy households that insured their crop on their own and suffered a loss in July to December 2018, 73.1 percent received no claim, and 69.2 percent are recorded with the reason 'others': no recorded cause at all (Report 587, Statement 4.14, reproduced exactly). A claim system that cannot say why it did not pay is blind at the point where a grievance would begin.

What the test got wrong

Two things did not hold. The registered failure rule carried no substantive threshold, and without one, splits where the tail is most of its frame fail on gaps of a fraction of a point; the sensitivity above shows the effect. The registered ranking test was defeated: across 21 states, the average awareness share predicts procurement receipt among tip households far better (Spearman 0.88) than the tail-applied verdict does (minus 0.04). The tail-applied verdict sends Haryana and Chhattisgarh to zero for failing their tails, and those are the states where procurement exists. A verdict about whether success reaches the tail is not a ranking of which state succeeds most, and the Tail-End Standard v0.2 now says so in its rules, together with a threshold that scales with the reference share.

Confidentiality, privacy and data sharing

The analysis uses survey records that the state collected under a statutory promise of confidentiality, and it is designed to keep that promise. What follows is a statement of method, not legal advice, and reflects the law as of October 2026; where a provision is described from published summaries rather than the official text, that is stated.

Statutory confidentiality of survey data. The Collection of Statistics Act, 2008 requires that information collected under it be used for statistical purposes, that no individual schedule or answer be published or disclosed without suppressing the identity of the informant, and that published statistics be arranged so that no informant can be identified, even by elimination (Section 9, described from published texts that differ slightly in wording). The unit records released by MoSPI carry no names.

The access agreement. The data were obtained from MoSPI's National Data Archive under its public-use data access agreement, which limits use to the stated non-commercial purpose, bars proprietary and law-enforcement use, prohibits any attempt to identify a person, family, or enterprise, and requires any inadvertent identification to be reported to the Ministry, and asks that publications cite the source and be sent to the Ministry. This paper is published as non-commercial research on those terms, and a copy will be sent as required.

Disclosure control in what is published. Results are published only as state-level aggregates. No cell is reported below 100 sample households drawn from at least 20 first-stage units, and the companion map shows the same aggregates. No household-level record, and no figure that could be reverse-engineered into one, leaves the analysis.

Personal data in fieldwork. When the Diagnostic is run as a service, it collects new data under the Digital Personal Data Protection Act, 2023 and the Digital Personal Data Protection Rules, 2025, notified in November 2025 with most obligations in force by May 2027 (reported commencement; to be checked against the notification). It does not rely on the Act's conditional exemption for research and statistical processing (Section 17(2)(b)) for client work. It follows the Tailenders Privacy and Confidentiality Policy and the Tail-End Protocol: consent in the respondent's language, the right to decline any question, no benefit conditional on answers, identifiers stored apart from responses, identifiable data destroyed within six months of the final report unless a contract requires longer for audit, no Aadhaar number ever requested (Aadhaar Act, 2016, Section 29), and no household-level data supplied to any office the respondent may need to contest.

Limits

The survey is a single cross-section from 2018-19, before several changes to procurement and crop insurance. Awareness is self-reported. Grounds for a sale grievance are observed only for households that sold a crop. Land class is taken from the area operated in the first visit. Many small groups are not testable and are reported as such, and with 1,017 tests about 51 failures would occur by chance, so individual cells are signals, and the counts are the evidence. Religion is bracketed by design and will be addressed in its own work. The data are licensed for non-commercial use, and the analysis is research.

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