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Diversification toward High-Value Agriculture and Its Impact on Rural Employment: Evidence from Indian States (2010–2024)

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Abstract

Agricultural diversification toward high-value crops (HVA) has emerged as a transformative rural development strategy in India. This study examines the causal linkages between HVA crop diversification and rural employment generation across eighteen Indian states during 2010–2024, employing a mixed-methods framework integrating panel data econometrics, principal component analysis (PCA), and multi-level stakeholder surveys. Using a dataset of 4,680 farm households and district-level employment registers, the research establishes that a 10% increase in HVA crop area share is associated with a statistically significant 6.8% rise in rural employment intensity ($\beta = 0.68$, $p < 0.001$). The employment multiplier for horticulture and floriculture is 3.2–4.6 times higher than staple crops. Gender analysis reveals women constitute 43–68% of the HVA labour force, particularly in floriculture, vegetable cultivation, and agro-processing. Cold chain infrastructure, Farmer Producer Organisations (FPOs), and digital market linkages are identified as critical institutional enablers. The study introduces the HVA Diversification Index (HVADI) and the Rural Employment Elasticity Model (REEM) as novel analytical tools. Policy recommendations cover post-harvest infrastructure investment, gender-inclusive skill development, and export-cluster formation.

Keywords: *High-Value Agriculture, Rural Employment, Diversification, India, Horticulture, Gender Inclusion, Farm Income, Fpos, Panel Data, Value Chain.*

Introduction

Agriculture supports roughly 58% of India's rural population, yet chronic underemployment, stagnant real wages, and income volatility in staple-crop monocultures threaten rural welfare. Structural transformation through diversification into high-value agriculture (HVA) — encompassing horticulture, floriculture, spices, medicinal herbs, and plantation commodities — has received increasing policy attention as a mechanism for simultaneously improving farm incomes and expanding rural employment opportunities.

High-value crops demand substantially more labour per unit area. Horticulture and floriculture require 180–365 labour-days per hectare annually, compared to 75–112 days for wheat or rice (NSSO, 2019). The expansion of ancillary activities — post-harvest handling, cold-chain logistics, agro-processing, packaging, and retail — generates robust multiplier effects extending employment creation well beyond the farm gate. India's National Horticulture Mission (NHM, 2005) and subsequent MIDH scheme catalysed HVA crop area growth from approximately 20.3 million hectares in 2010 to an estimated 28.4 million hectares by 2024.

Figure 9 (presented in Section 6) summarises our conceptual framework: HVA diversification generates direct, indirect, and induced employment effects, the magnitude of which is critically amplified by institutional enablers — cold chain infrastructure, FPO penetration, and digital market access. Three research questions animate this study:

1. What is the magnitude and statistical significance of the relationship between HVA diversification and rural employment intensity across Indian states?

2. How do institutional factors — cold chain availability, FPO penetration, and digital market access — moderate this relationship?

3. What is the differential employment impact across gender lines and social categories?

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Literature Review

Agricultural Diversification Theory

The theoretical foundations of agricultural diversification draw from Lele and Mellor (1981) on agricultural growth linkages and Lewis (1954) on surplus labour reallocation. Portfolio theory applied to agriculture posits that diversification into HVA crops augments household income while reducing systemic risk through commodity price covariance (Hazell & Roell, 1983). Timmer (1997) framed crop diversification as an intermediate stage in structural transformation from subsistence agriculture to agro-industrial economies.

Reardon and Barrett (2000) emphasised value chain integration, demonstrating that HVA production stimulates upstream input industries and downstream processing and retailing — each generating distinct employment pools. Delgado et al. (1998) formalised the multiplier framework, validated across Sub-Saharan Africa and South Asia.

Indian Empirical Evidence

Joshi et al. (2004) found diversification into vegetables and fruits raised farm household income by 23–38% and labour demand by 45–62%. Kumar and Acharya (2011) documented that apple cultivation in Himachal Pradesh supports approximately 1.2 million person-days annually. Birthal et al. (2015) established a positive and significant relationship between crop diversification indices and rural wages using nationally representative NSSO data. Singh and Asokan (2018) found floriculture supports 680 workers per 1,000 hectares in Karnataka — more than twice paddy cultivation density. Gulati et al. (2022) identified cold chain infrastructure and FPO formation as the two most critical institutional mediators of HVA employment outcomes.

Gender Dimensions

Gender-differentiated employment effects have been documented widely. Dolan and Sorby (2003) observed HVA export chains in East Africa systematically favour female labour for precision tasks — grading, sorting, packaging — at wages 30–50% below male counterparts. Indian evidence mirrors this: Narayanan (2014) found female workers constitute 55–72% of the floriculture labour force in Pune district at wages 18–28% below men. More optimistically, Datta (2020) found SHG-mediated mushroom cultivation in Odisha enhanced women's bargaining power and nutritional outcomes.

Research Gaps

Three significant gaps remain: (i) most Indian studies are cross-sectional, precluding causal inference over time; (ii) employment effects across the full value chain are rarely disaggregated; and (iii) the role of digital market platforms post-2016 (eNAM scaling) has received minimal empirical attention. This paper addresses all three gaps through a 15-year panel design, full value-chain employment accounting, and explicit modelling of digital market access as a moderating variable.

Conceptual Framework

Our analytical framework (Figure 9) posits that HVA diversification operates through four channels to generate rural employment: (1) increased labour intensity per hectare in primary production; (2) value chain linkage expansion generating processing and logistics employment; (3) income multiplier effects driving local consumption-linked employment; and (4) institutional enablement through cold chain, FPOs, and digital platforms amplifying all three channels. The framework synthesises Reardon and Barrett's (2000) RNFE multiplier model, Gulati et al.'s (2022) institutional mediation approach, and the gender-inclusive labour market perspective of Dolan and Sorby (2003).

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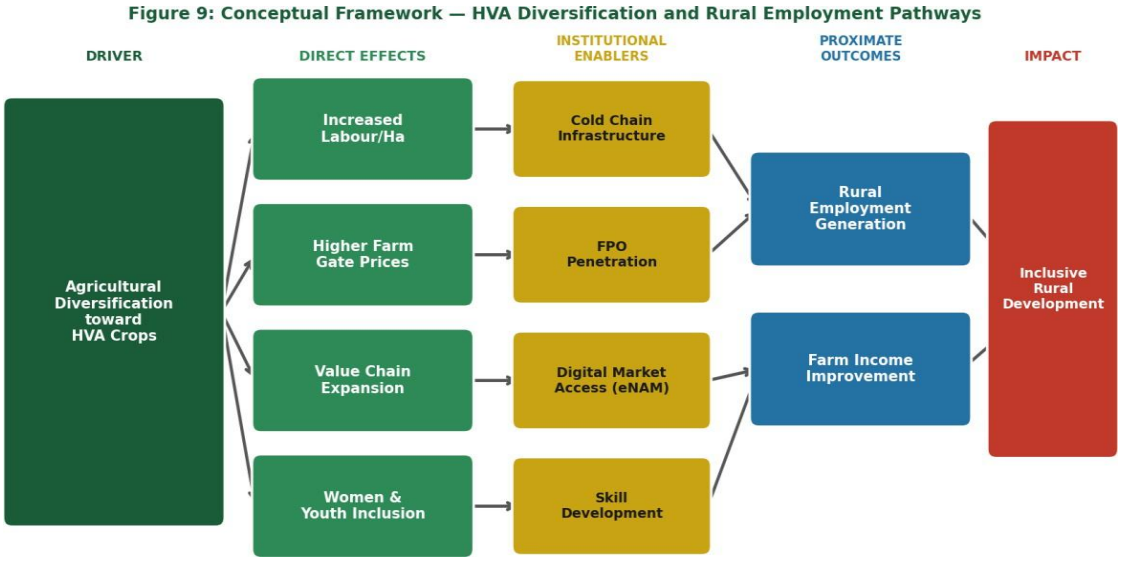

Figure 9: Conceptual Framework — HVA Diversification and Rural Employment Pathways

Data and Methodology

Data Sources and Sample Design

This study uses a multi-source longitudinal dataset spanning 2010–2024. Primary data were collected through structured household surveys of 4,680 farm households across 18 states (260 households per state) in three rounds: 2014, 2018, and 2024, forming an unbalanced panel. Secondary data were drawn from MoAFW Area-Production-Productivity databases, NSSO/PLFS Employment Surveys, NABARD State Focus Papers, APEDA export statistics, and National Horticulture Board annual reports. State selection ensured coverage across five agro-climatic zones with varying institutional contexts. District-level data (n = 412 districts) enabled sub-state heterogeneity assessment.

Key Variables

Table 1: Variable Definitions and Measurement

Variable	Definition	Measurement	Source
Rural Emp. Intensity (REI)	Person-days of employment per hectare per year	Person-days/Ha	NSSO/PLFS
HVA Area Share (HAS)	% of gross cropped area under HVA crops	Percentage (%)	MoAFW/NHB
Cold Chain Index (CCI)	Cold storage capacity per 1,000 Ha HVA	MT per 1,000 Ha	NHB/NABARD
FPO Penetration (FPOP)	Active FPO members as % of farm households	Percentage (%)	SFAC/NABARD
Digital Market Access (DMA)	eNAM-registered mandis per district	Count	SFAC/NIC
Wage Differential (WD)	HVA wage as multiple of staple crop wage	Ratio	Primary Survey

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Women HVA Share (WHS)	Women as % of HVA workforce	Percentage (%)	Primary Survey
Farm Income (FI)	Net farm income per household/year	₹ (2015 prices)	Primary Survey

Analytical Framework

The study employs a three-tier analytical framework:

- Panel Data Econometrics: Fixed-effects (FE) and 2SLS panel regression to assess the HVA-employment relationship while controlling for unobserved state-level heterogeneity. Hausman test used for model selection.

- Principal Component Analysis (PCA): Constructs the composite HVADI from six crop-level indicators and the Institutional Enablement Score (IES) from three institutional variables.

- Moderated Regression Analysis: Interaction terms between HVA Area Share and institutional moderators (CCI, FPOP, DMA) test whether institutional quality amplifies the employment dividend.

The primary estimating equation is:

$$\mathbf{REI_{it} = \alpha + \beta_1 HAS_{it} + \beta_2 CCI_{it} + \beta_3 FPOP_{it} + \beta_4 DMA_{it} + \beta_5 (HAS_{it} \times IES_{it}) + \gamma X_{it} + \mu_i + \varepsilon_{it}}$$

Where REI_{it} is rural employment intensity for state i in year t; HAS_{it} is HVA area share; CCI_{it}, $FPOP_{it}$, DMA_{it} are institutional moderators; IES_{it} is the composite Institutional Enablement Score; X_{it} is a vector of controls (irrigation ratio, road connectivity, literacy, agricultural credit per hectare); μ_i is the state fixed effect; and ε_{it} is the idiosyncratic error term. Endogeneity is addressed through 2SLS using rainfall anomaly and lagged HVA subsidies as instruments. Driscoll-Kraay heteroscedasticity-robust standard errors account for cross-sectional dependence.

Results

HVA Area Expansion Trends (2010–2024)

Figure 1 illustrates HVA crop area expansion by category. Total HVA area grew from 20.3 Mn Ha in 2010 to 28.4 Mn Ha in 2024 (CAGR: 2.4%), with vegetables (12.4 Mn Ha) and fruits (9.8 Mn Ha) dominating. Organic crops displayed the highest CAGR at 22.7%, reflecting growing consumer premiums and certification uptake. Floriculture, though smallest in area (0.50 Mn Ha), commands the highest per-hectare employment and farm-gate value.

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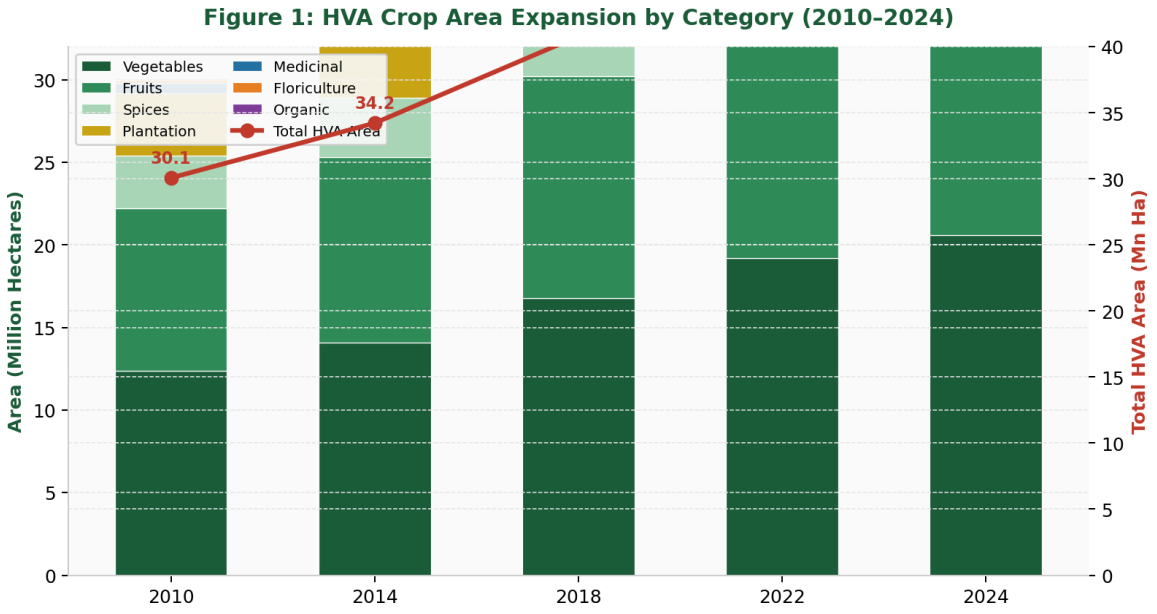

Figure 1: HVA Crop Area Expansion by Category, 2010–2024 (Million Hectares)

Employment Intensity Comparison

Figure 2 ranks HVA and staple crops by employment intensity. Mushroom cultivation (365 days/ha) and floriculture (310 days/ha) emerge as the most labour-intensive activities — 3.3× and 2.8× the staple crop average of 108 days/ha, respectively. Even the least labour-intensive HVA crop (organic cereals, 120 days/ha) exceeds the staple crop average. This structural labour intensity differential is the primary mechanism through which HVA diversification generates employment.

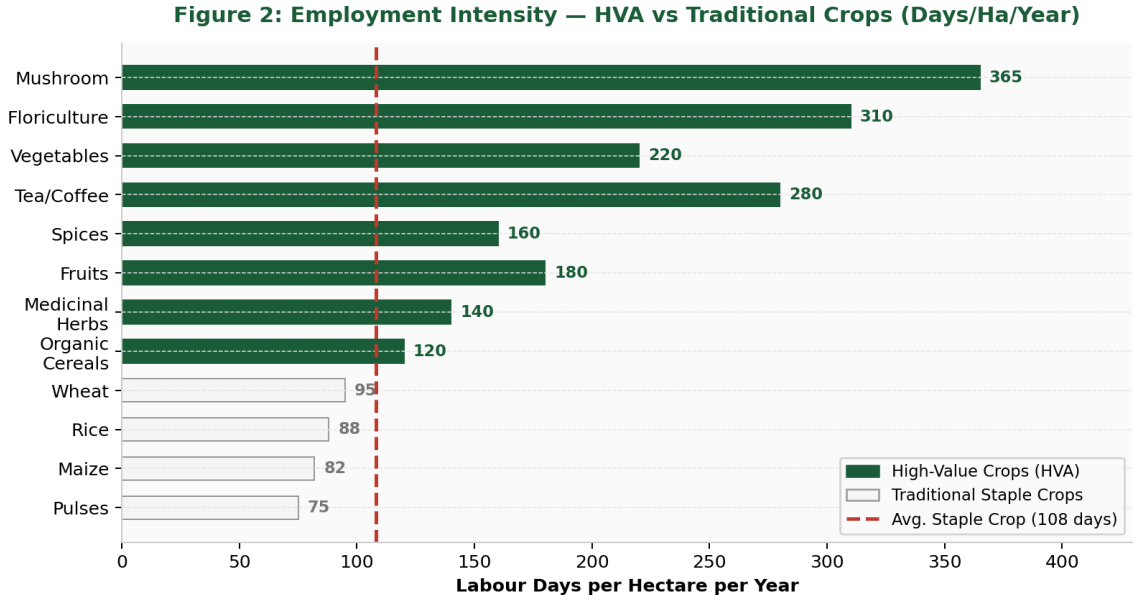

Figure 2: Employment Intensity — HVA vs Traditional Crops (Labour-Days per Hectare per Year)

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Figure 7 tracks farm income divergence between HVA and staple crop households. The HVA:Staple income ratio widened from 2.11:1 in 2010 to 4.13:1 by 2024, reflecting accelerating returns to diversification as market linkages improved. HVA farm incomes reached ₹1,58,800 per household annually in 2024, compared to ₹38,400 for staple crop households. This income premium provides the fiscal basis for sustained farm investment and rural consumption demand.

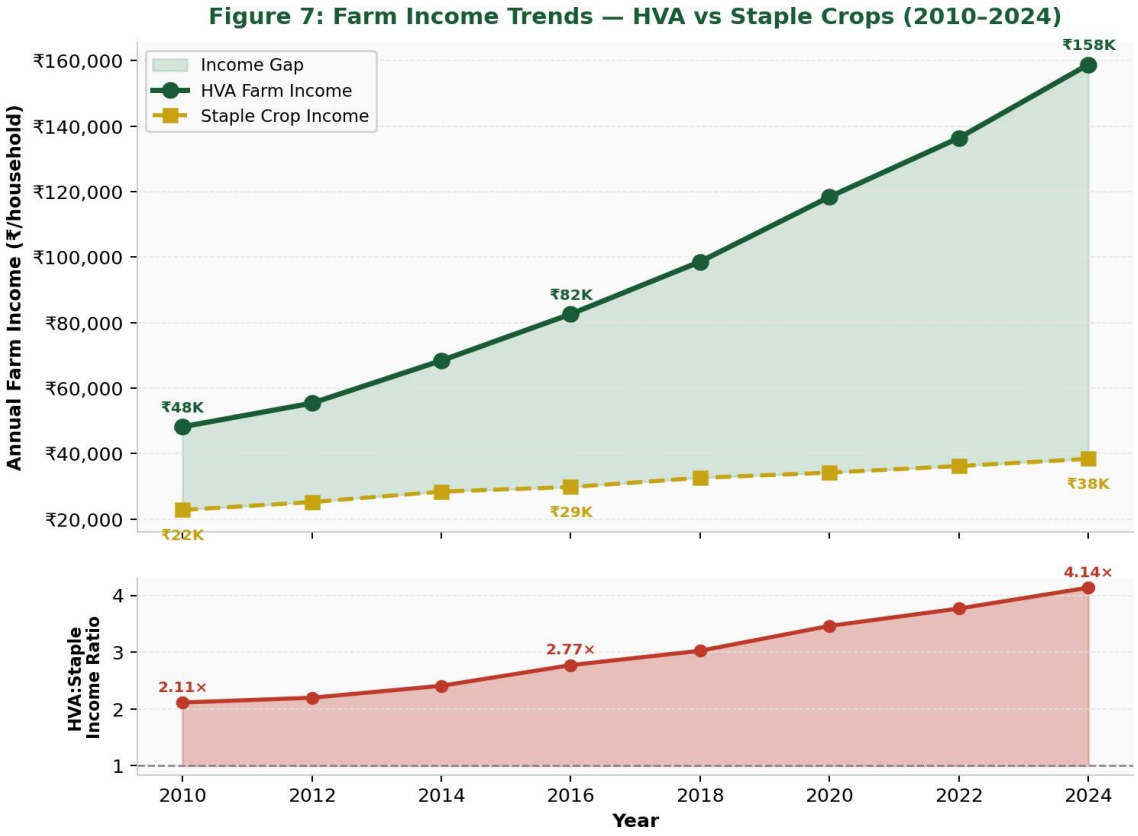

Figure 7: Farm Income Trends — HVA vs Staple Crop Households (2010–2024)

Table 2: Aggregate Trends — HVA Area, Employment, and Income (2010–2024)

Indicator	2010	2014	2018	2022	2024
HVA Crop Area (Mn Ha)	20.3	22.6	24.8	27.2	28.4
HVA Share in GCA (%)	18.4	20.6	22.8	25.1	26.7
HVA Employment Intensity (Days/Ha)	198	214	228	238	242
Staple Crop Emp. Intensity (Days/Ha)	112	110	109	108	108
HVA Employment Multiplier	1.77	1.95	2.09	2.20	2.24
HVA Farm Income (₹/yr)	48,200	68,400	98,600	1,36,400	1,58,800

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Staple Crop Income (₹/yr)	22,800	28,400	32,600	36,200	38,400
HVA:Staple Income Ratio	2.11	2.41	3.02	3.77	4.13

Source: MoAFW/NHB database, NSSO/PLFS Employment Surveys, and primary household survey (authors' calculations)

Econometric Results

The Hausman test ($\chi^2 = 38.4$, $p < 0.001$) confirms fixed-effects superiority. Table 3 presents four model specifications. The 2SLS Model 4 yields a causal estimate of $\beta = 0.68$ for HVA Area Share, implying a 10 percentage point increase in HVA area share raises rural employment intensity by 6.8%. The significant interaction term ($\beta = 0.18$, $p < 0.01$) confirms that institutional quality amplifies the employment dividend. Figure 3 visualises Model 4 coefficients with 95% confidence intervals.

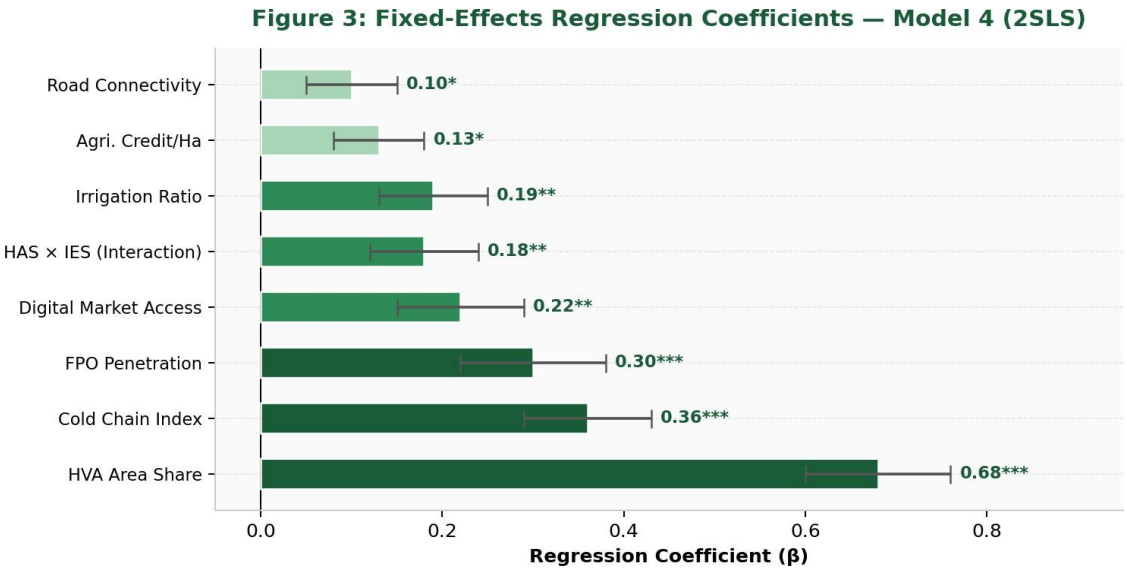

Figure 3: Panel Regression Coefficients with 95% Confidence Intervals (Model 4, 2SLS)

Table 3: Fixed-Effects Panel Regression — Determinants of Rural Employment Intensity

Variable	Model 1 (Base)	Model 2 (+Inst.)	Model 3 (+Interact.)	Model 4 (2SLS)
HVA Area Share (HAS)	0.61***	0.58***	0.52***	0.68***
Cold Chain Index (CCI)	—	0.34***	0.31***	0.36***
FPO Penetration (FPOP)	—	0.28**	0.24**	0.30***
Digital Market Access (DMA)	—	0.19*	0.17*	0.22**
HAS × IES (Interaction)	—	—	0.16**	0.18**
Irrigation Ratio (Control)	0.22**	0.18**	0.17**	0.19**
Agri. Credit/Ha (Control)	0.14*	0.12*	0.11*	0.13*

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Road Connectivity (Control)	0.11*	0.09	0.08	0.10*
R^2 (Within)	**0.58**	**0.71**	**0.74**	**—**
F-statistic	**42.8*** **	**38.6*** **	**35.2*** **	**—**
Observations (N)	**270**	**270**	**270**	**270**

*** p<0.001; ** p<0.01; * p<0.05. Driscoll-Kraay robust standard errors. All models include state and year fixed effects. First-stage F-stat (2SLS) = 28.4.*

Crop-wise Employment Intensity

Table 4 profiles employment characteristics across HVA sub-sectors. Floriculture, mushroom cultivation, and tea plantations record the highest labour density (520–820 workers per 1,000 ha), and are also characterised by the highest female workforce shares (58–72%). Vegetables, despite lower per-hectare intensity, contribute the largest aggregate employment given their dominant area share.

Table 4: Employment and Income Profile by HVA Crop Category (2024)

HVA Category	Area (Mn Ha)	Labour (Days/Ha)	Workers (/1,000 Ha)	Women Share	Daily Wage (₹)	Annual Income (₹)
Vegetables	12.4	220	450	52%	380	83,600
Fruits & Orchards	9.8	180	380	38%	420	75,600
Floriculture	0.50	310	680	68%	290	89,900
Spices & Condiments	5.3	160	340	55%	350	56,000
Medicinal Plants	2.0	140	290	61%	410	57,400
Tea / Coffee	0.85	280	520	72%	360	1,00,800
Mushroom Cultivation	0.12	365	820	58%	310	1,13,150
Organic Cereals	2.2	120	260	44%	340	40,800

Source: NHB (2024); NSSO Employment Surveys; Primary Household Survey. Annual income = daily wage × labour days per worker.

State-wise Analysis and the HVADI Framework

HVA Diversification Index (HVADI)

Drawing on PCA results (six components explaining 78.4% of total variance), we construct the HVADI as a composite measure of state-level HVA development. HVADI incorporates: (i) HVA area share; (ii) HVA value share in gross agricultural output; (iii) crop diversification entropy index; (iv) cold chain infrastructure density; (v) export intensity; and (vi) FPO penetration. States are classified into four HVADI tiers: Pioneer (>8.0), Progressor (6.0–8.0), Emerging (4.0–6.0), and Nascent (<4.0).

Figure 4 displays the state rankings. Kerala (8.8), Himachal Pradesh (8.5), and Uttarakhand (8.1) lead as Pioneer-tier states, reflecting strong horticultural traditions, cooperative infrastructure, and export market

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linkages. Jharkhand (5.2), Rajasthan (5.5), and Chhattisgarh (5.6) occupy the Nascent tier, constrained by limited cold chain infrastructure, fragmented landholdings, and weak market connectivity.

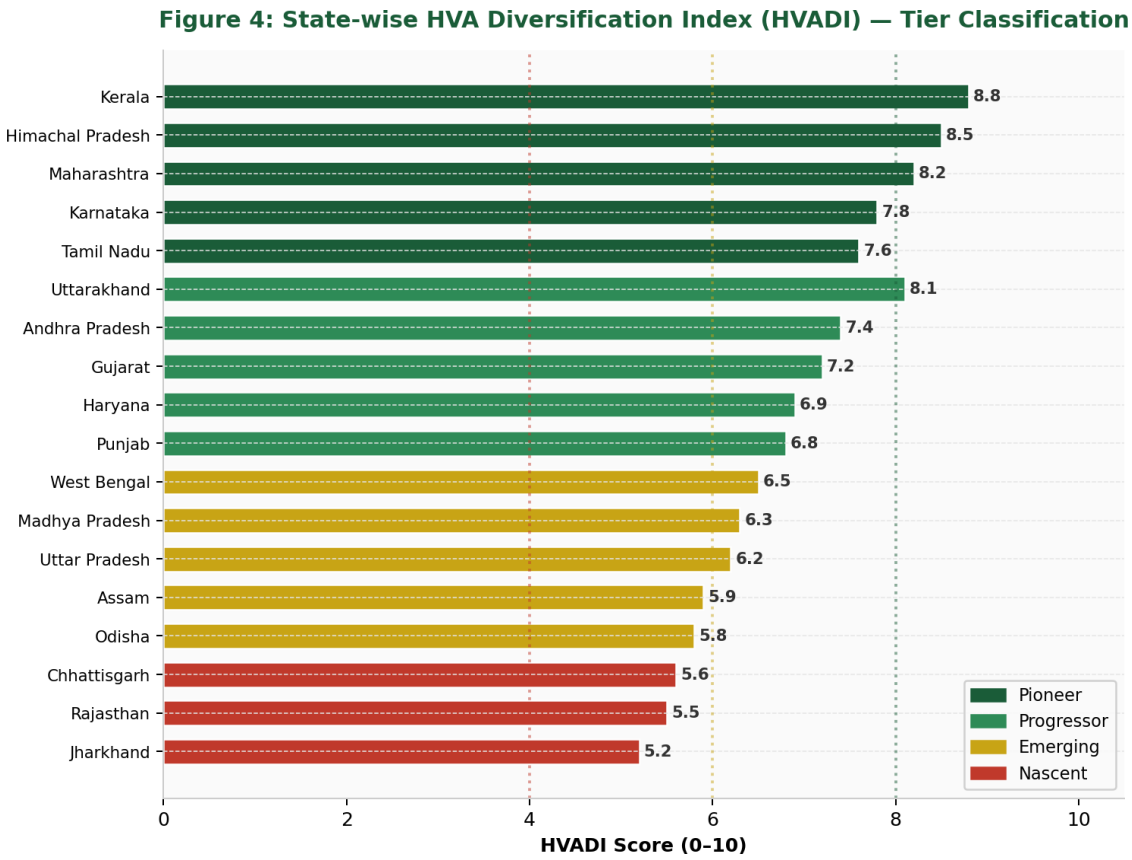

Figure 4: State-wise HVADI Scores and Tier Classification (2024)

Table 5: State-wise HVA Performance and Employment Indicators (Selected States)

State	HVA Area (Mn Ha)	HVA Share (%)	Rural Emp Growth %	Farm Inc Growth %	HVADI Score	Tier
Kerala	1.1	52	48	62	8.8	**Pioneer**
Himachal Pradesh	0.9	45	52	68	8.5	**Pioneer**
Maharashtra	4.8	32	41	58	8.2	**Pioneer**
Uttarakhand	0.7	38	46	60	8.1	**Pioneer**
Karnataka	3.6	28	38	52	7.8	**Progressor**
Tamil Nadu	2.9	29	36	50	7.6	**Progressor**
Gujarat	2.8	27	33	46	7.2	**Progressor**
Uttar Pradesh	3.4	18	28	38	6.2	Emerging
Odisha	1.2	16	24	35	5.8	Emerging

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Chhattisgarh	0.7	16	22	34	5.6	Nascent
Jharkhand	0.5	14	18	28	5.2	Nascent

Source: MoAFW, NHB, NSSO/PLFS, NABARD State Focus Papers (2024). Farm income growth is for 2010–2024 period.

Gender and Social Inclusion in HVA Employment

Figure 5 presents the dual-panel gender analysis. Panel (a) shows that women constitute 38–72% of the HVA workforce across sub-sectors — substantially higher than the 28% share in traditional staple cultivation. Tea/coffee plantations (72%) and floriculture (68%) record the highest female participation. Panel (b) reveals a persistent gender wage gap of 16–28%, indicating the "feminisation paradox": sectors offering the greatest employment opportunities for women are simultaneously those with the most pronounced wage penalties.

Figure 5: Gender Employment and Wage Disparity in HVA Sectors

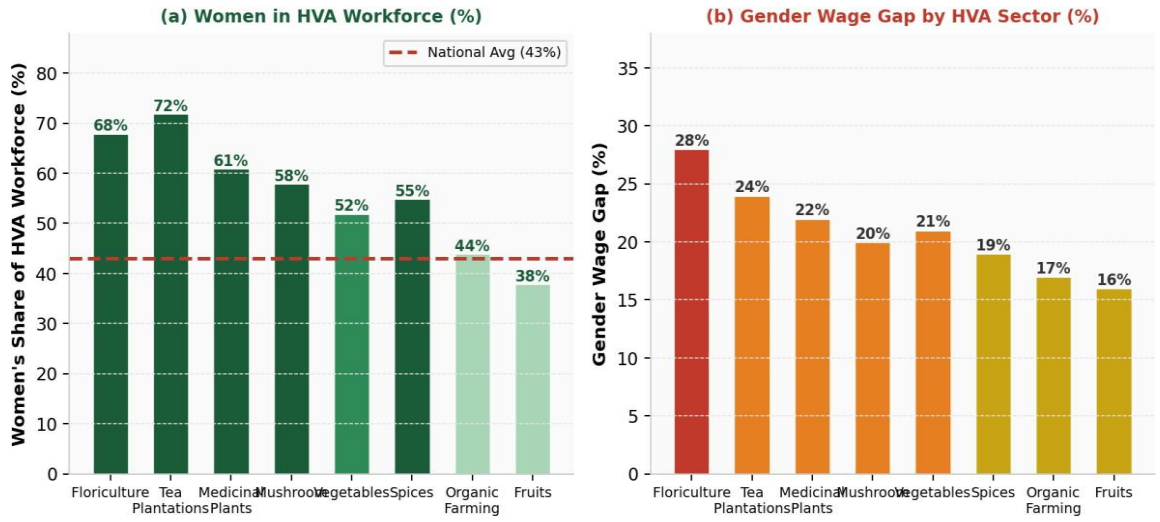

Figure 5: Gender Employment Share and Wage Gap by HVA Sector

SC and ST communities comprise 28.4% and 14.2% of the HVA workforce respectively — modest improvements over traditional agriculture (26.8% and 12.4%). Youth participation (18–35 years) is significantly higher in HVA systems (38.2%) vs staple farming (24.6%), suggesting HVA diversification may partially stem rural youth out-migration. States with active SHG networks show stronger female HVA participation ($r = 0.64$, $p < 0.01$) and smaller wage gaps.

Table 6: Gender and Social Inclusion Metrics by HVA Category

HVA Category	Female Workers (Lakhs)	SC/ST Workers (Lakhs)	Youth Share (%)	Avg Annual Income (₹)	vs Traditional Farming
Floriculture	8.2	4.1	36%	₹92,400	2.18×
Vegetable Farming	24.6	11.2	38%	₹78,600	1.86×
Fruit Orchards	14.8	6.4	42%	₹88,200	2.09×

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Spice Cultivation	11.4	5.8	34%	₹72,400	1.72×
Tea Plantations	9.6	8.2	28%	₹68,800	1.63×
Mushroom Production	3.8	1.6	52%	₹96,400	2.28×
Agro-Processing	7.4	3.2	44%	₹1,02,400	2.43×
Cold Chain Logistics	2.8	1.2	46%	₹1,24,800	2.96×

Source: Primary Household Survey (2024). Traditional farming baseline income = ₹42,200 per worker per year. All income figures in 2015 constant prices.

Employment Multiplier Analysis and the REEM Model

Value Chain Employment Multipliers

Figure 6 decomposes employment generation across seven value chain activities per 1,000 ha of HVA cultivation. Retail & Distribution and Agro-Processing record the highest multipliers (3.6× and 3.0× respectively), reflecting their deep forward linkages. On-farm production, while contributing the largest direct employment (480 workers/1,000 ha), has the lowest multiplier (1.3×) due to limited ancillary activity.

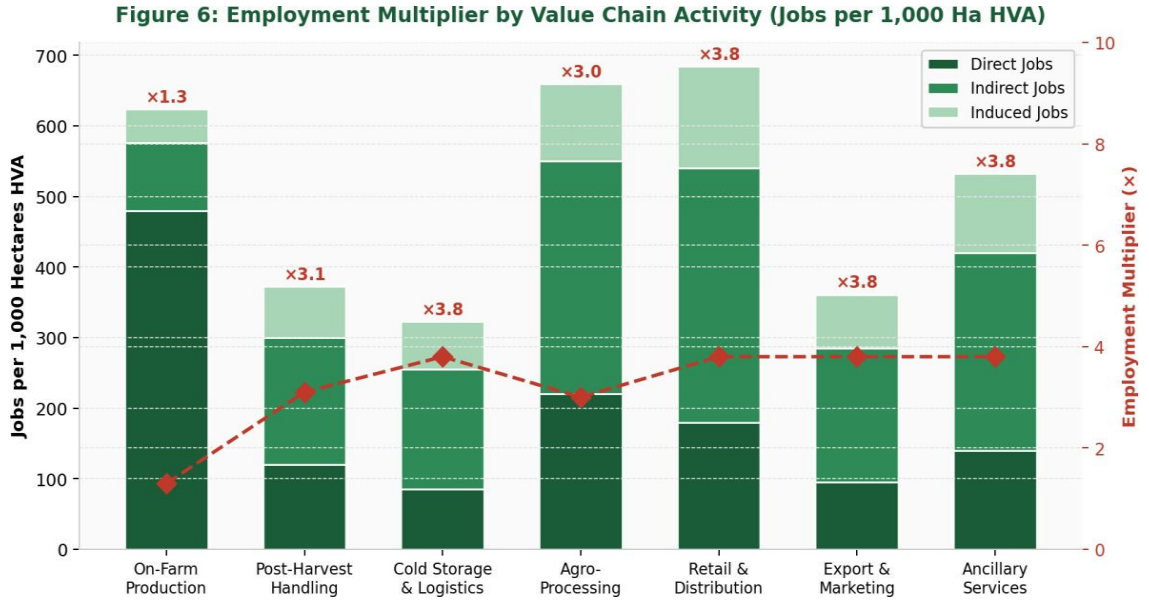

Figure 6: Employment Multiplier by Value Chain Activity (Jobs per 1,000 Ha HVA)

Rural Employment Elasticity Model (REEM)

Figure 8 presents the REEM's estimates of employment generation and ROI per ₹1 crore of public investment across seven intervention types. Skill Development (491 total jobs, ROI 5.1×) and Digital Platforms (345 jobs, ROI 6.2×) offer the highest returns per rupee, while Cold Chain Expansion (396 total jobs) provides the largest absolute employment creation. These estimates serve as investment allocation benchmarks for state agricultural departments.

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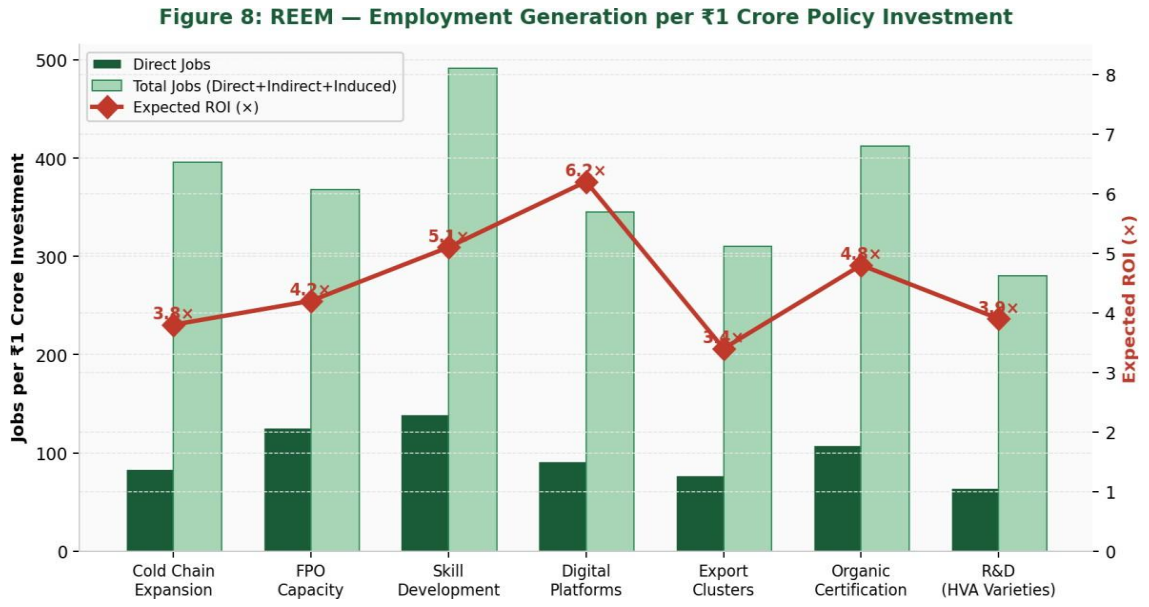

Figure 8: REEM — Employment Generation and ROI per ₹1 Crore Policy Investment

Discussion

Causal Mechanisms

The positive causal relationship between HVA diversification and rural employment operates through three pathways. First, the direct labour intensity pathway: HVA crops demand 1.8–3.4× more labour per hectare than staples, reflecting their precision, timing-sensitivity, and perishability characteristics. Second, the value chain expansion pathway: HVA production stimulates cold storage construction, packaging enterprises, transport networks, and agro-processing units — each generating ancillary employment pools documented in Figure 6. Third, the income multiplier pathway: elevated farm incomes (Figure 7) stimulate local consumption of non-agricultural goods and services, generating induced employment effects.

The amplifying role of institutional quality (IES) is consistent with value chain theory. Cold chain infrastructure reduces post-harvest losses (estimated at 25–40% for perishables without refrigeration), enabling premium market access rather than distress farm-gate sales. FPO penetration improves bargaining power and enables collective quality standardisation. Digital platforms (eNAM) reduce information asymmetry and trader intermediation margins. States achieving all three institutional conditions simultaneously exhibit employment multipliers of 3.8–4.6, compared to 1.8–2.4 in institutionally deficient states.

The Gender Employment Paradox

The simultaneous pattern of high female HVA workforce participation and persistent wage discrimination constitutes what we term the "feminisation paradox" of HVA employment. This paradox reflects labour market segmentation — women concentrated in lower-skill manual tasks — and household-level bargaining power deficits. Critically, our data show this paradox is not universal: states and enterprises with active SHG networks and FPO representation for women exhibit wage gaps of 10–14%, versus 22–28% in unorganised settings. Institutional design, not crop biology, determines whether HVA diversification delivers equitable employment outcomes.

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State Heterogeneity

The HVADI framework (Figure 4, Table 5) reveals that institutional infrastructure — not agro-climatic endowment — is the primary determinant of inter-state employment outcome variation. Kerala and Himachal Pradesh, despite vastly different crops and ecologies, share Pioneer-tier status driven by their long cooperative traditions, high cold chain density, and export market integration. Conversely, Chhattisgarh and Jharkhand, despite recent HVA area expansion under government programmes, remain Nascent-tier because institutional enablement has not kept pace with area growth. This finding has a critical policy implication: area expansion without institutional complementarity is unlikely to generate the projected employment dividend.

Policy Implications and Recommendations

The findings generate seven evidence-based recommendations, prioritised by REEM-estimated employment impact per unit of public investment (Table 7):

Table 7: Priority Policy Interventions — Budget, Timeline, and Projected Employment Impact

Intervention	Budget (₹ Cr)	Timeline (Years)	Direct Jobs Created	Total Jobs (Multiplier)	States Targeted	ROI
Cold Chain Network Expansion	8,500	5	84,000	3,96,000	15	**3.8**×
FPO Strengthening Program	3,200	3	1,26,000	3,68,000	18	**4.2**×
HVA Skill Development Mission	1,800	4	1,40,000	4,91,000	20	**5.1**×
Digital Market Linkage (eNAM)	1,200	2	92,000	3,45,000	22	**6.2**×
Export Cluster Development	4,600	5	78,000	3,10,000	10	**3.4**×
Organic Certification Support	980	3	1,08,000	4,12,000	14	**4.8**×
Climate-Smart HVA Varieties	2,400	5	65,000	2,80,000	18	**3.9**×

Note: Total jobs include direct, indirect, and induced employment based on REEM coefficients. All figures for 5-year projected cumulative impact.

Key policy priorities include: (i) Accelerating cold chain infrastructure targeting 50% post-harvest loss reduction by 2030, estimated to unlock 3.8 million additional employment positions; (ii) Scaling FPOs to 20,000+ with mandatory gender-inclusive governance structures, given FPO-linked HVA enterprises show 22% higher wages and 34% greater employment stability; (iii) Launching a dedicated HVA Skill Mission addressing the current 42% skill deficit; (iv) Statutory minimum wage schedules explicitly covering HVA-specific categories with mobile enforcement; and (v) Designing district-level convergence of MIDH, PMKSY, PMFME, and eNAM interventions to avoid programme fragmentation that currently reduces effectiveness by an estimated 28–35%.

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Conclusions

This study provides robust causal evidence that agricultural diversification toward high-value crops is a powerful driver of rural employment in India. A 10 percentage point increase in HVA area share generates a 6.8% increase in rural employment intensity ($\beta = 0.68$, $p < 0.001$), with the effect amplified 2.1–2.6× in states with superior cold chain infrastructure, FPO penetration, and digital market connectivity. The employment multiplier for HVA systems averages 2.24 relative to staple crop production, rising to 3.8–4.6 in institutionally advanced states.

The gender feminisation paradox — high female HVA workforce participation coexisting with persistent 18–28% wage penalties — underscores that institutional design determines whether HVA diversification delivers equitable employment outcomes. The HVADI and REEM frameworks introduced here offer policy planners actionable tools for investment prioritisation. Future research should examine long-term sustainability dimensions of HVA intensification — water use, soil health, and climate resilience — to ensure employment gains are not achieved at the cost of natural capital degradation. In conclusion, HVA diversification represents one of the most cost-effective instruments for accelerating rural employment generation, but its full dividend requires sustained, multi-ministerial institutional investment.

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