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BA Economics Honours | Semester 3 | Calicut University

Agricultural Development in India

Course Code: ECO3MN203 • Module 3

Module III: Technological Change in Agriculture

Technological change is the primary catalyst for overcoming Ricardian diminishing returns in agriculture. The transition from traditional organic farming to high-yielding biological, chemical, and digital technologies has reshaped India's agrarian landscape.

Unit 14 & 15: The Green Revolution and Its Multi-Dimensional Impact

Introduced in the mid-1960s under the leadership of M.S. Swaminathan and Norman Borlaug, the **Green Revolution** deployed a synchronized technology package: High Yielding Variety (HYV) semi-dwarf seeds, chemical fertilizers, synthetic pesticides, and controlled tubewell irrigation.

Economic and Ecological Evaluation

- **Triumphs:** Achieved absolute national food self-sufficiency, averted catastrophic famines, broke food import dependency, generated rural employment, and stimulated industrial input manufacturing.
- **Regional Disparities:** Benefits were heavily concentrated in the canal-irrigated northwestern plains (Punjab, Haryana, Western Uttar Pradesh), bypassing eastern and dryland central India.
- **Inter-Crop Imbalance:** Focused overwhelmingly on wheat and rice, disincentivizing the cultivation of nutrient-dense millets, pulses, and oilseeds.
- **Ecological Crisis:** Intensive tubewell pumping depleted underground aquifers; excessive chemical application contaminated groundwater with nitrates; and monoculture reduced biodiversity, leading to the second-generation agricultural crisis.

Unit 16: Modern Technological Frontiers: Towards an Evergreen Revolution

Contemporary agricultural policy focuses on sustainable vertical intensification:

- **Biotechnology and GM Crops:** Genetically modified drought-tolerant and pest-resistant crop varieties.
- **Micro-Irrigation:** Drip and sprinkler systems under the *Per Drop More Crop* initiative (PMKSY), saving 40% water and expanding fertilizer efficiency.
- **Digital Agriculture:** Soil Health Cards, satellite remote sensing for crop insurance (PMFBY), Kisan Drones for precision spraying, and artificial intelligence-driven weather forecasting.

Advanced Theoretical Formulations and Empirical Frameworks (Analytical Division 1)

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Empirical Methodology, Identification Strategies, and Econometric Estimation

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Comparative Institutional Analysis, Market Failures, and Policy Governance

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Comprehensive Empirical Analysis: The Kerala Model and Sub-National Development

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Policy Synthesis and Analytical Evaluation

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