

INDIRA GANDHI INSTITUTE OF DEVELOPMENT RESEARCH

SEMESTER: AUGUST-DECEMBER 2024

COURSE TITLE: Markets, Incentives and Agriculture in India Course 6501

INSTRUCTOR(S): Vijay Laxmi Pandey

Course Objective

The objective of this course is to familiarise students with contemporary issues in Indian agriculture and to enable them to analyse these issues using economic concepts.

Learning Outcomes

By the end of this course students will be able to

1. To participate in the decision making and undertake independent research in agriculture.
2. Apply knowledge of economic theory and quantitative techniques in analysing the problems in agriculture.
3. Develop an understanding for analysing sustainability issues related to agriculture
4. Analyse the impact of different policies on agriculture specifically Indian agriculture

Module I: Introduction and Issues Concerning Agricultural Development

Nature, Scope and subject matter of agricultural economics, role of agriculture in economic development, Interdependence and models of interaction between agriculture and the rest of the economy, Shultz`s Thesis of Transforming Traditional Agriculture, Mellor`s Theory of Agricultural Development, Boserup`s Theory of Agricultural Development, Ranis & FEI Model of Agricultural Development, Jorgenson`s Neo-Classical Model of a Dual economy

Module II: Agricultural Performance and Structural Changes in Indian Agriculture

Trend in area, production, and productivity of different crops; Major agricultural policies over the period

Diversification of agriculture, Livestock production, Fisheries, Poultry production

Module III: Agricultural Prices, Costs, Income and Issues Related to it

Agricultural prices, Trends in relative prices of farm products, Supply response to prices in agriculture, Food inflation, Agricultural Price Policy, Minimum Support Price, Agricultural Cost Concepts, Costs of different crops, Public distribution system, Agricultural Income

Module IV: Agricultural Inputs

Land institutions, Land Markets, Farm Size and Productivity,
Fertilizer: Trend in use and Efficiency, Fertilizer Subsidy and issues
Seeds: Different type of seeds, Issues related to Protection of Plant Varieties and Farmers' Rights (PPVFR), Bt Cotton and Issues
Irrigation and Power: Trend, Subsidy, Ground Water Management, PIM, Issues related to irrigation
Labour: Trend in agricultural employment, Wages, MGNERGA
Agricultural machineries: Tractors, Pump Sets, Tillage machines

Module V: Gender and Agriculture

Gender and agricultural production- access to resources, agricultural production and productivity, technology adoption, migration and change in labour pattern

Measuring empowerment in agriculture

Module VI: Agricultural Investment Capital Formation in and for Agriculture, Public Investment and Private Investment, Substitutability and complementarity issues,

Module VII: Agricultural Finance

Types and Sources of Credit; Issues Related to Agricultural Credit, and institutional environment of agricultural credit; policies and their implications

Module VIII: Agricultural Marketing and Producers' collectives

Agricultural markets, Regulated markets and market interventions, Marketing efficiency, Marketed and Marketable surplus, Issues related to Agricultural markets

Producers' collectives- FPO/FPC; Farmers' Cooperatives
Agricultural Commodity Futures Market

Module IX: Agriculture Trade Policy and Its Impact

International trade in agricultural commodities, Terms of Trade, Competitiveness of various crops, Measures of Competitiveness, WTO: Agreement on Agriculture; SPS; TRIPs, changing structure and pattern

Module X: Agriculture and Nutrition (Lectures-1)

Pathways from agriculture to nutrition, different measures of dietary diversity, measurement of nutrition outcomes

Module XI: Impact Assessment of Agricultural Research and Interventions (Lecture- 1)

Module XII: Environmental issues, climate change, conservation agriculture (Lectures -3)

Environmental issues related to agriculture, impact of climate change

Adaptation and mitigation strategies – Organic farming, ZBNF, Precision Agriculture, Resource Conservation Technologies (ZT, SRI, Micro-irrigation), Nano Technology

Reference Books

1. Ramesh Chand, Pramod Joshi, and Shyam Khadka (Eds). 2021. Indian Agriculture Towards 2030: Pathways for Enhancing Farmers' Income, Nutritional Security and Sustainable Food and Farm Systems, Springer
2. Evenson R and Prabhu Pingali, 2007, Handbook of Agricultural Economics, Vol 3
3. Gardner B. L. and Gordon C Raussar, 2001, Handbook of Agricultural Economics. Vol 1A, & V2B Trevor Young, David Colman, Principles of Agricultural Economics, Cambridge University Press,

Some Important References

Role of agriculture in economic development

1. Awokuse, T.O. and Xie, Ruizhi. 2015. Does agriculture really matter for economic growth in developing countries. Canadian Journal of Agril. Econ., Vol 63, pp77-99.
2. Richard Tiffin & Xavier Irz, 2006. Is agriculture the engine of growth. Agricultural Economics, Vol 35: 79-89.
3. Alain De Janvry. 2010. Agriculture for development: new paradigm and options for success. Agricultural Economics, Vol 41(1): 17–36,
4. Tsakok, I and Gardner B. 2007. Agriculture in economic development: Primary engine of growth or chicken and egg. Am. J. Agr. Econ. Vol 89 (5): 1145-1151.
5. Gollin, D. (2010). Agricultural Productivity and Economic Growth. Handbook of Agricultural Economics, vol. 4, pp. 3825 – 3866.
6. John W. Mellor. 2017. Agricultural Development And Economic Transformation: Promoting Growth with Poverty Reduction. Ch 1 &2

Indian Agriculture

1. Nicolas Rada. 2016. India's post green revolution agricultural performance: what is driving growth? Agril. Econ. Vol 47, pp 341-350.
2. von Braun, Joachim, 2005. "Agricultural Economics and Distributional Effects," Agricultural Economics, Vol 32, (1), pp 1-20
3. Pandey, Vijay Laxmi and Suganthi Dhankar (2015). "Fueling agricultural growth in India", Land Use Policy, vol.42, pp 227-232.

Farm Size and Productivity

1. Raya Das. (2021). Farm Size and Productivity Debate in Indian Agriculture Five Decades of Green Revolution. EPW vol 56 no 9
2. Steven M. Helfand, Matthew P.H. Taylor. 2021. The inverse relationship between farm size and productivity: refocusing the debate. Food Policy 99, pp 1-12.
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4. Sam Desiere, Dean Jolliffe. (2018). Land productivity and plot size: Is measurement error driving the inverse relationship? Journal of Development Economics 130 (2018) 84–98

5. Nicholas E. Rada, Keith O. Fuglie. (2019). New perspectives on farm size and productivity. *Food Policy* 84 (2019) 147–152
6. Gautam, M., Ahmed, A. (2019). Too small to be beautiful? The farm size and productivity relationship in Bangladesh. *Food Policy*, Vol 84, 165-175.

Agricultural Prices

1. Amlan Das Gupta. 2016. Impact of Cash Transfers Compared to Subsidy in Food: Evidence from the Indian Public Distribution System. Working Paper, Economics and Planning Unit, Indian Statistical Institute
2. Andaleeb Rahman. 2016. Universal food security program and nutritional intake: Evidence from the hunger prone KBK districts in Odisha. *Food Policy* 63 (2016) 73–86.
3. Reetika Khera (2014). Cash vs. in-kind transfers: Indian data meets theory. *Food Policy* 46, 116–128
4. Jean Drèze, Reetika Khera. 2015. Understanding Leakages in the Public Distribution System. *EPW*, Vol 50, No. 7.
5. Masiero and Prakash. (2015). Does Computerisation Reduce PDS Leakage? Lessons from Karnataka. *EPW*, vol 50, No. 50.
6. Drèze, Jean, P Gupta, R Khera and I Pimenta (2019). Casting the Net: India's Public Distribution System after the Food Security Act. *EPW*, Vol 54, No 6, pp 36–47.

Cost of Cultivation

1. Ashok Vishandass, and B.Lukka. 2013. Pricing, Costs, Returns and Productivity in Indian Crop Sector during 2000s. Discussion Paper No. 7.COMMISSION FOR AGRICULTURAL COSTS AND PRICES. Dept. of Agriculture & Cooperation, Ministry of Agriculture, Government of India
2. N. Narayanamoorthy. 2013. Profitability in crops cultivation in India: Some evidence from Cost of Cultivation Survey data. *Indian Journal of Agricultural Economics*, vol. 68(1).
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Investment and Subsidies

1. Seema Bathla. 2014. Public and Private Capital Formation and Agricultural Growth in India: State Level Analysis of Inter-linkages during Pre- and Post-reform Periods. *Agricultural Economics Research Review*, Vol. 27, No.1
2. Shenggen Fan, Ashok Gulati, Sukhadeo Thorat. 2008. Investment, subsidies, and pro-poor growth in rural India. *Agricultural Economics* 39 (2008) 163–170
3. Seema Bathla. 2017. Futuristic Private and Public Capital Requirements in Agriculture for Doubling Farmers' Income across the States. *Agricultural Economics Research Review*, Vol. 30 (Conference Number) pp 101-116
4. Shenggen Fan, Ashok Gulati, Sukhadeo Thorat. 2008. Investment, subsidies, and pro-poor growth in rural India. *Agricultural Economics*, 39, 163–170
5. Seema Bathla P. K. Joshi and Anjani Kumar. 2017. Revisiting Investments and Subsidies to Accelerate Agricultural Income and Alleviate Rural Poverty in India. IFPRI Discussion Paper 01701.

Land

1. Besley and Burges. 2000. Land reforms, poverty reduction and growth: evidence from India. *Quarterly Journal of Economics*, 115 (2) 389 – 430.
2. Tim Hanstad, T. Haque and Robin Nielsen. 2008. Improving land access for India's poor. EPW.
3. Murali D A and R Vijay. 2017. Revival of Agriculture Sector and Increasing Tenancy in India. EPW vol 52, number 31, pp 18-21.
4. Otsuka, K.2007. Efficiency and equity effects of land markets. *Handbook of Agricultural Economics*, Vol III, Ch 51.
5. Dandekar, A., & Bhattacharya, S. (2017). Lives in Debt: Narratives of Agrarian Distress and Farmer Suicides. *Economic & Political Weekly*, vol LII no 21, 77-84.
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8. K. Deininger , S. Jin & H. K. Nagarajan (2009) Land Reforms, Poverty Reduction, and Economic Growth: Evidence from India, *The Journal of Development Studies*, 45:4, 496-521,

Fertilizer

1. Avinash Kishore, K V Praveen, Devesh Roy. 2013. Direct Cash Transfer System for Fertilisers: Why It Might be Hard to Implement. EPW, vol xlvi no 52.
2. Ghosh, N. 2004.Reducing dependence on chemical fertilizers and its financial implications for farmers in India. *Ecological Economics*, 49 pp 149-162.
3. Sharma, V., and H. Thaker. 2010. Fertilizer Subsidy in India: Who Are the Beneficiaries? *Economic and Political Weekly*. Vol 45; 68–76.

Irrigation

1. Narayanamoorthy. 2018. Financial performance of India's irrigation sector: a historical analysis. *International Journal of Water Resources Development*, 34:1, 116-131
2. Prashant Tiwari and Rajeev Chaube. 2015. Issues in integrated water resource management in India. *Journal of Indian Water Resources Society*, Vol 35, No.1, pp 16-21
3. Regina Birner, S. Gupta and N. Sharma. 2011. 'The Economy of Agricultural Policy Reform in India: Fertilizers and Electricity for Irrigation'. *Research Monograph*, International Food Policy Research, 261p.
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5. Mukherji, A. 2020. Sustainable groundwater management in India needs a water-energy-food nexus approach. *Applied Economic Perspectives and Policy*. (Featured Article) 00, 00, pp. 1–17. doi:10.1002/aep.13123
6. Shah, M. et al. 2021. Water and Agricultural Transformation in India A Symbiotic Relationship—II vol 56(30) EPW

Credit

1. Kumar, V.K. Sonkar, S. Saroj. 2020. Access to Credit in Eastern India: Implications for the Economic Well-being of Agricultural Households. EPW, Vol. 55, Issue No. 21,
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3. Martin Kanz. 2016. What Does Debt Relief Do for Development? Evidence from India's Bailout for Rural Households. *American Economic Journal: Applied Economics*. 8(4): 66–99
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Seeds

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BT Cotton

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2. Glene Davis Stone (2012). Constructing Facts: Bt Cotton Narratives in India. EPW. Vol 47, No.38. Pp 62- 70.
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5. Kathage, Jonas and Matin Qaim (2012): "Economic Impacts and Impact Dynamics of Bt (*Bacillus Thuringiensis*) Cotton in India", *Proceedings of the National Academy of Sciences*, 109(29): 11652-656.
6. Krishna, Vijesh V and Matin Qaim (2012): "Bt Cotton and Sustainability of Pesticide Reductions in India", *Agricultural Systems*, 107: 47-55.
7. Kavitha Kuruganti. 2009. Bt Cotton and the Myth of Enhanced Yields. EPW vol 44 no 22

Agreement on Agriculture

1. Jayanthi Thennakoon , Kym Anderson. 2015. Could the proposed WTO Special Safeguard Mechanism protect farmers from low international prices? *Food Policy* vol 50 pp. 106–113
2. Kirtika Suneja, 2019. India loses export incentive case filed by US at WTO. Nov 01, 2019, *The Economic Times*.
3. For Swiss Formula and Uruguay Round Formula
https://www.wto.org/english/tratop_e/agric_e/agnegs_swissformula_e.htm#formula

Sanitary and Phytosanitary Agreement

1. Kasturi Das. 2008. Coping with SPS challenges in India: WTO and beyond. *Journal of International Economic Law* 11(4), 971–1019.
2. Nair, M.D., 2011. GATT, TRIPS, WTO and CBD- Relevance to Agriculture, *Journal of Intellectual Property Rights*. Vol 16, pp 176-182.
3. Mukherjee, A. et al. 2019. SPS Barriers to India's Agriculture Export: Learning from the EU Experiences in SPS and Food Safety Standards. ICRIER, March 2019.

Agricultural Marketing

1. Shoumitro Chatterjee and Devesh Kapur. 2016. Understanding Price Variation in Agricultural Commodities in India: MSP, Government Procurement, and Agriculture Markets. *India Policy Forum* 2016. <http://www.ncaer.org/events/ipf-2016/IPF-2016-Paper-Chatterjee-Kapur.pdf>
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Climate change and Conservation Agriculture

1. K.S. Kavi Kumar. 2009. Climate Sensitivity of Indian Agriculture.
<http://www.mse.ac.in/pub/working%20paper%2043.pdf>
2. Ranuzzi, R. Srivastava. 2012. Impact of Climate Change on Agriculture and Food Security. http://www.icrier.org/pdf/Policy_Series_No_16.pdf
3. PK Aggarwal. 2008. Global climate change and Indian agriculture: impact, adaptation and mitigation. *Indian Journal of Agricultural Sciences*, Vol 78 (10) pp. 911-19. <http://indiaenvironmentportal.org.in/files/Global%20Climate%20Change.pdf>
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6. Birthal et al. 2021. Climate change and land-use in Indian agriculture. *Land Use Policy*, Vol 109

7. Nihar Janglea, Mamta Mehraa and David M. Drora. 2016. Climate Cost of Cultivation: A New Crop Index Method to Quantify Farmers' Cost of Climate Change Exemplified in Rural India. *The Geneva Papers*, 41, (280–306)

Gender, Agriculture and Nutrition

1. Alkire, S., Meinzen-Dick, R., Peterman, A., Quisumbing, A., Seymour, G., and Vaz., A. (2013), 'The Women's Empowerment in Agriculture Index', *World Development*, 52: 71-91.
2. Elisa Cavatorta, Bhavani Shankar and Artemisa Flores-martinez. 2015. Explaining Cross-State Disparities in Child Nutrition in Rural India. *World Development*. Vol. 76, pp. 216–237.
3. Headey, D., Chiu, A., & Kadiyala, S. (2012). Agriculture's role in the Indian enigma: help or hindrance to the crisis of under nutrition?. *Food Security*, 4(1), 87–102.
4. Vijay Laxmi Pandey, S. Mahendra Dev and Usha Jaychandran (2016). "Impact of agricultural interventions on the nutritional status in South Asia: A review", *Food Policy*, vol. 62, pp. 28-40.
5. Law, C., Fraser, I., Piracha, M. 2020. Nutrition Transition and Changing Food Preferences in India. *Journal of Agricultural Economics*, Vol. 71, No. 1, 118–143

INDIRA GANDHI INSTITUTE OF DEVELOPMENT RESEARCH

SEMESTER: August-December 2024.

COURSE TITLE: Time Series Econometrics INSTRUCTOR: R. Krishnan.

TEACHING ASSISTANT: None

COURSE DESCRIPTION: This course provides a detailed introduction to the theoretical and practical aspects of univariate and multivariate time series, using current methodology and software.

COURSE OBJECTIVES: The course has twin objectives: first one is to impart knowledge on how to model, estimate and predict any given time series. Specifically, students are taught the various aspects that distinguish stationary and nonstationary time series and how to model such series. Second one is to familiarise students with the various aspects of important multivariate time series techniques that will enable them to model real world macroeconomic issues and problems.

COURSE OUTCOMES:

CO1: At the end of the course, students must be able to estimate and predict any given time series, using, especially, the Box-Jenkins time series model building methodology.

CO2: Students should be able to apply the ideas to real time series data and interpret the outcomes of their analyses.

CO3: This course should enable the students to proceed to the next stage of acquiring graduate-level skills to understand time series concepts.

COURSE REQUIREMENTS: MUST have credited the core course, Econometrics II offered by the institute.

COURSE CONTENTS: Please refer to Annexure 1.

EVALUATION: Two examinations, a midsemester and a final one based on the entire syllabus and an empirical assignment of student's choice.

REFERENCES: Please refer to Annexure 2.

Annexure 1

Course Outline

I. Introduction and Overview

II. Stochastic Models and Forecasting

(A) Univariate stationary processes

(1) Linear stationary models and properties

1.1 Pure AR and MA processes

1.2 Mixed (ARMA) processes

1.3 Miscellaneous topics (autocovariance generating function, sums of ARMA processes)

(2) Estimation

2.1 Conditional and exact ML estimation of ARMA models

2.2 Exact finite sample forecasts.

(B) Forecasting

(1) Principles of forecasting

(2) Model based forecasting -- MMSE and properties.

1.1 Principle and theory of forecasting.

1.2 Calculating forecasts based on infinite observations

1.3 Practical aspects of forecasting – Forecasts based on finite observations – Updating and confidence intervals for forecasts -- Estimation of a missing value.

1.4 Comparing forecast accuracy – Root mean square.

(C) Practical aspects of estimation and diagnostic procedures.

(D) Examples of ARMA models.

III. Univariate Non-stationary processes

(A) Linear non-stationary models: introduction and meaning

(B) Trend stationary and difference stationary processes – A comparison

(C) Univariate processes with deterministic time trend – estimation and inference

(D) Univariate processes with stochastic trend -- Concept of a unit root process – Why unit roots – Implications for hypothesis testing and interpretation.

(1) Various cases and tests for unit roots

- 1.1 Dickey-Fuller tests
- 1.2 Phillips-Perron test
- 1.3 Efficient unit root tests
- 1.4 Unit root tests under structural change
- 1.5 Variance ratio test
- 1.6 Other issues in unit root testing
- 1.7 Examples and implications.

IV. Permanent and Transitory components: Trend-cycle decomposition

- 1.1 Defining permanent and temporary components
- 1.2 Why extract components?
- 1.3 Hodrick-Prescott filter and Beveridge-Nelson decomposition

V. Modeling Volatility

Univariate ARCH models – Symmetric linear models (Engle's ARCH and GARCH models)—Asymmetric nonlinear models (EGARCH,GJR-GARCH models) -- ARCH-M models Estimation, issues, testing and forecasting.

VI. Covariance Stationary Vector processes (VAR)

Vector Autoregressive Processes (VAR) -- Assumptions and Properties -- Estimation and hypothesis Testing – Restricted and Unrestricted – Meaning and testing for Granger causality -- Impulse Response analysis – Standard Errors for Impulse Responses – Variance decomposition – Generalized impulse response analysis – Applications.

VII. Structural VAR (SVAR) Structural vector autoregression (SVAR) -- Meaning – Issues, identification schemes and estimation – Implications – Applications.

VIII. Cointegration

Cointegration -- An introduction – Engle-Granger two step estimation – Granger Representation Theorem (GRT) -- Vector Error Correction Models -- VECMs (Soren Johansen) -- Issues involved in system estimation – Hypotheses testing -- Applications.

(IX) VAR – More topics

Weak Exogeneity – Partial versus full systems–Identification and estimation–VAR with I(1) exogenous variables – Applications -- Regression with Integrated Processes – Structural Error Correction Models – Issues and Applications.

Annexure 2

Select Books

- Box, G.E.P., G.M.Jenkins, G.C.Reinsel (2008), Time Series Analysis: Forecasting and Control, Prentice Hall International, Inc., New Jersey.
- Hamilton, J.D. (1994), Time series Analysis, Princeton University Press, Princeton, New Jersey.
- Maddala, G.S. and In-Moo Kim (1999), Unit Roots, Cointegration, and Structural Change, Cambridge University Press, Cambridge.
- Harvey, A.C. (1984) Time Series Models, Heritage Publishers, New Delhi .
- Bannerjee, A. et.al., (1993), Cointegration, Error Correction and the econometric Analysis of Non-Stationary Data, Oxford University Press, Oxford.
- S.Johansen (1995) Likelihood- Based Inference in Cointegrated Vector autoregressive Models, Oxford University Press.
- G.C.Reinsel Elements of Multivariate Time Series Analysis, Springer-Verlag, 1993. G. Amisano and C.Giannini Topics in Structural VAR Econometrics, Springer, 1997, (Second Edition).
- N.Ericsson and J.S. Irons Testing Exogeneity, Oxford University Press, 1994.
- H.Lutkepohl New introduction to Multiple Time Series Analysis, Springer-Verlag, 2005.
- D.F.Hendry Dynamic Econometrics, Oxford University Press, 1995.

Select Papers

- E.Leamer Vector autoregressions for causal inference, Carnegie-Rochester Conference Series on Public Policy, 22, 1985,255-304.
- T.Cooley and S.Leroy, Atheoretical macroeconometrics – A critique, Journal of Monetary Economics, 16,1985, 283-308.
- C.W.J. Granger, Some recent developments in a concept causality, Journal of Econometrics, 39, 1988,199-211.
- J.W.Keating, Structural approaches to vector autoregressions, Federal Reserve Bank of St.Louis, 1992, 37-57.
- H.Pesaran and Y.Shin Generalized impulse responses in linear multivariate models Economics Letters, 58, 1998, 17-29.
- S.Johansen Statistical analysis of cointegration vectors, Journal of Economic Dynamics And Control, 12, 1988, 231-254.
- S.Johansen Cointegration in partial systems and the efficiency of single-equation analysis, Journal of Econometrics, 52, 1992, 389-402.
- H.P. Boswijk Efficient inference on cointegration parameters in structural error correction models, Journal of Econometrics, 69,1995, 133-158.
- S.Hylleberg and G.Mizon Cointegration and error correction mechanisms, Economic Journal, 99, 1989, 113-125.

INDIRA GANDHI INSTITUTE OF DEVELOPMENT RESEARCH

SEMESTER: August-December 2024

COURSE TITLE: Energy and environment II (6401)

INSTRUCTOR: Manisha Jain

TEACHING ASSISTANT: Deepak Khushwaha

COURSE DESCRIPTION: This is an intermediate course in energy and the environment. The objective of the course is to introduce students to the advanced concepts in energy and environment, policies relating to efficient use of energy and low carbon economy. Energy is required for economic growth and social welfare. But the current energy system is causing environmental degradation. The primary purpose of energy and the environment research is to find ways to maximize growth and minimize environmental impact. This course exposes students to the contemporary research questions in energy and environment.

COURSE OBJECTIVES:

- Develop an understanding of the relationships between economic growth, sustainable development, energy use and environmental impact
- Identify the variables that are used to measure economic growth, sustainable development, energy use and environmental impact
- Build expertise in working with energy data through energy balance tables and emissions data through emissions inventories
- Explore the relationship between growth and development with energy and emissions using data and indicators
- Review literature to identify research questions in different development issues such as – poverty, inequality, health, income, industry and trade to energy use and environmental impact
- Introduce students to undertake independent empirical research in the chosen area of development issue

COURSE OUTCOMES:

- **CO1 – Introduce students to the technical, economic and policy issues in pollution abatement and impacts**
- **CO2 – Impart technical, economic and policy related knowledge to students in the field of energy use and climate change mitigation and impacts**
- **CO3 – Equip students with top-down and bottom-up policy evaluation skills**
- **CO4 – Impart skills to students to undertake independent empirical research**

COURSE REQUIREMENTS: Energy and Environment I

COURSE CONTENTS:

1. Economic growth and sustainable development
 - 1.1. Indicators of economic growth, National accounts statistics and classification of industries
 - 1.2. Indicators of sustainable development,
 - 1.3. Interactions between society, economy and environment,

- 1.4. Unsustainable development,
- 1.5. United Nations 17 Sustainable Development goals, their targets and indicators,
- 1.6. Interlinkages of SDGs and energy and environment

2. Environment, pollution, emissions inventory

- 2.1. Pollutants, their sources and trends in developed and developing countries,
- 2.2. Pollutant concentration and impacts on health
- 2.3. GHGs and non-GHG pollutants
- 2.4. Greenhouse gases, global warming potential
- 2.5. Emissions inventories – EDGAR, REAS, PIK/Potsdam, UNFCCC
- 2.6. Environmental pollution from energy use

3. Energy and climate change

- 3.1. Energy sources, types, flows and transformation
- 3.2. Calorific values of fuels
- 3.3. Energy balance tables
- 3.4. Electricity generation, transmissions and distribution
- 3.5. Emission factors, CO₂ emissions from energy use
- 3.6. Energy indicators of sustainable development

4. Energy and environmental policies

- 4.1. Types of policy interventions in energy and environment
- 4.2. Need for policy interventions
- 4.3. Monitoring and tracking progress in policy outcome
- 4.4. Policy evaluation techniques

5. Index decomposition analysis

- 5.1. Index number theory
- 5.2. IPAT and KAYA identity framework
- 5.3. Index decomposition analysis
- 5.4. Readings for replication
 - 5.4.1. KAYA identity paper
 - 5.4.2. Energy intensity paper

6. Discrete choice modelling

- 6.1. Conceptual framework
- 6.2. Revealed preference and stated preference
- 6.3. Design of experiment
- 6.4. Design of choice sets
- 6.5. Estimation of discrete choice models
- 6.6. Interpretation of results

EVALUATION:

Quizzes and presentations: 30%
Term paper: 40%
Final paper: 30%

Textbook:

- Energy and Human Ambitions on a Finite Planet: Assessing and Adapting to Planetary Limit by Murphy, Thomas W, J from University of California, San Diego
- Energy, environment and development by Jose Goldemberg and Oswaldo Lucon, Earthscan from Routledge

REFERENCES:

- Zweifel Peter, Praktiknjo Aaron and Georg Erdmann, Energy Economics: Theory and Applications, Springer 2017
- Schwarz P.M. Energy economics, Routledge, 2017
- The Energy system : Technology, economics, markets and policy by Bradford, Travis, - 2018, - MIT Pr
- Energy, environment and development by Goldemberg, Jose, - 2009, - Earthscan
- Environmental and energy policy and the economy(Vol.1) by Kotchen, Matthew J. , Stock, James H. and Wolfram, Catherine D. , - 2020, - University of Chicago Pr (Chicago) – BOOK
- Environmental and energy policy and the economy(Vol.2) by Kotchen, Matthew J. , Stock, James H. and Wolfram, Catherine D., - 2020, - University of Chicago Pr (Chicago) – BOOK
- Energy economics: Concepts, issues, markets and governance by Bhattacharyya, Subhes C
- Climate Change: Global Risks, Challenges, and Decisions by Ed. by Katherine Richardson, Will Steffen and Diana Liverman, - 2014, - Cambridge Uni Pr (Cambridge)
- Environmental Kuznets Curve (EKC) : A Manual / by Ozcan, Burcu and Ozturk, Ilhan, - 2019, - Academic Pr (London)
- Introduction to sustainable development by Ossewaarde, Martin J, - 2018, - Sage (New Delhi)
- Renewable energy : A Primer for the twenty-first century by Usher, Bruce, - 2019, - Columbia Uni pr
- State of India's environment report, 2021 by Centre for Science and Environment, - 2021, - CSE (New Delhi)
- Energy, A Beginner's Guide by Vaclav Smil from One World Publications.

INDIRA GANDHI INSTITUTE OF DEVELOPMENT RESEARCH

SEMESTER: AUGUST-DECEMBER 2024

COURSE TITLE: Issues in Corporate Finance and Growth

TEACHING ASSISTANT: one

COURSE DESCRIPTION: What is the relationship between growth and the financial system? This is the principal question that we would be asking in this course. Economists have disagreed sharply about the role of the financial sector in economic growth.

Lucas Robert E. (1988) “On the Mechanics of Economic Development” Journal of Monetary Economics, 22:3-42 Dismisses finance as an “over stressed” determinant of growth.

Miller M.H (1998) “Financial Markets and Economic Growth” Journal of Applied Corporate Finance, 11:8-14. “The idea that financial markets contribute to growth is a proposition too obvious for serious discussion”.

Though the major policy focus has been on GDP growth in aggregate, in this course our focus would be largely on firm growth, though we would discuss GDP growth as well. We would also try to understand these disagreements and the differing policy perspectives they lead to.

COURSE OBJECTIVES: the course will be useful in understanding the role of the financial system in fostering or impeding firm growth and the by implication the growth of the overall economy. Core concepts and theory such as market efficiency, portfolio theory, CAPM, Finance constraints and the Modigliani-Miller propositions will be taught with objective of identifying the factors that would influence firm growth.

COURSE OUTCOMES:

CO1. Understand how the financial system to facilitates firm growth

CO2. Gain exposure to different theoretical and empirical underpinnings of
Corporate Finance

COURSE REQUIREMENTS:

Course requirements include (i) a mid-term and a final exam, and (ii) a term paper with/without class presentation. This depends on time available and the number of students registering for the course. The course grade will be computed on the basis of the following weights assigned to the different requirements:

Mid –Term Exam: 30 per cent

Final Exam: 50 per cent

Term paper with presentation: 20 per cent

- Minimum attendance of 85 per cent as per Institute rules.
- On-time attendance in class.

- Mobile phones to be kept away during class time.
- No late submissions of term paper except for documented medical reasons and emergencies.
- Academic dishonesty in any form, including plagiarism to be subject to disciplinary action as per Institute rules.
- Class participation to be considered for borderline grades

1. COURSE CONTENTS:

Introduction

- i) Aivazian, V., 1998, 'Microeconomic Elements and Perspectives from Finance Theory', in J.M. Fanelli and R. Medhora (eds.), *Financial Reform in Developing Countries*, Basingstoke: Macmillan.
- ii) Miller M.H (1998) "Financial Markets and Economic Growth" *Journal of Applied Corporate Finance*, 11:8-14.
- iii) McKinnon R.I. (1973) *Money and Capital in Economic Development*, The Brookings Institution, Washington D.C.

2. *Investment*

- i) Branson W.H. *Macroeconomic Theory and Policy*, Harper and Row, Singapore, Chapter 13.
- ii) Hay, DA and Morris, Derek J (1991). *Industrial Economics and Organization: Theory And Evidence*, Oxford University Press. Ch. 12.
- iii) Copeland T.E and Weston F.J.(1992) *Financial Theory and Corporate Policy*, 3 rd Edition, Addison-Wesley Publishing Company. Ch. 2.

3. *Theory of Growth of the Firm*

- i) Hay, DA and Morris, Derek J (1991). *Industrial Economics and Organization: Theory And Evidence*, Oxford University Press. Ch. 10.

4. *Portfolio Theory*

- i) Markowitz H.M. (1987) Mean Variance Analysis in Portfolio Choice and Capital Markets Basil Blackwell Ltd., Oxford. Ch.1.
- ii) Elton E.J and Gruber M.J. (1991) Modern Portfolio Theory and Investment Analysis John Wiley & Sons, Singapore. Chs 1,2 and 3.
- iii) Copeland T.E. and Weston F.J.(1992) Financial Theory and Corporate Policy Addison-Wesley Publishing Co. Mass. Ch.6.

5. Market efficiency

- i) Fama, Eugene (1970). "Efficient Capital Markets: A Review of Theory and Empirical Work", *Journal of Finance*, 25, pp. 383-417.
- ii) Fama, Eugene (1991). "Efficient Capital Markets II", *Journal of Finance*, 46, pp. 1575-617.

6. Capital Asset Pricing Model (CAPM).

- i) Hay, DA and Morris, Derek J (1991). *Industrial Economics and Organization: Theory And Evidence*, Oxford University Press. Chs. 11
- ii) Copeland T.E and Weston F.J.(1992) *Financial Theory and Corporate Policy*, 3 rd Edition, Addison-Wesley Publishing Company. Ch. 7.

7. Corporate Finance: Analysis of flow of funds, Cost of funds, Gearing, Retention ratio

- i) Hay, DA and Morris, Derek J (1991). *Industrial Economics and Organization: Theory and Evidence*, Oxford University Press. Chs. 11
- ii) Miller H.M. (1988) "The Modigliani-Miller Propositions after Thirty years" *Journal of Economic Perspectives*, 2(4) pp. 99-120
- iii) Stiglitz J.E. (1988) "Why Financial Structure Matters" *Journal of Economic Perspectives*, 2(4) pp. 121-26.
- iv) Rajan R.G. and L. Zingales (1995) "What do we know about capital structure?" *Journal of Finance*.
- v) Crockett, J and Friend, I (1988) "DIVIDEND POLICY IN PERSPECTIVE: CAN THEORY EXPLAIN BEHAVIOR?" *The Review of Economics and Statistics*
- vi) Aivazian V. and Booth L. (2003) "Do emerging market firms follow different dividend policies from US firms?" *Journal of Financial Research* 26(3), pp371-387

8. Understanding Flow of Funds Data

- i) Mayers C. (1990) "Financial Systems, Corporate Finance and Investment" in R.G. Hubbard (ed) Asymmetric Information, Corporate Finance and Investment, University of Chicago Press.
- ii) Singh A. and J. Hamid (1992) "Corporate Financial Structures in Developing Countries" International Finance Corporation, Technical Paper no.1
- iii) Allen, F., Chakrabarti, R., De, S., & Qian, J. ". (2012). Financing Firms in India. *Journal of Financial Intermediation*, 21 (3), 409-445.

9. Trade Credit

- i) Petersen M.A. and R.G. Rajan (1997) "Trade Credit Theories and Evidence" *Review of Financial Studies* 10, pp. 661-692.
- ii) Choi W.G. and Kim Y. (2005) "Trade Credit and the Effect of Macro-Financial Shocks: Evidence from U.S. panel Data" *Journal of Financial and Quantitative Analysis*, 40(4) pp. 897-925.

10. Investment once again.

- i) Hubbard R.G. (1997) "Capital market imperfections and Investment" NBER Working Paper no. 5996.(also available in *Journal of Economic Literature*, Vol.36, No.1, pp. 193-225.)
- ii) Athey, Michael J., and P. S. Laumas, 1994, 'Internal Funds and Corporate Investment in India', *Journal of Development Economics*, Vol.45, pp. 287-303.
- iii) Fazzari, Steven M., R. G. Hubbard and B. C. Petersen, 1988, "Financing constraints and corporate investment", *Brooking Papers on Economic Activity*, Vol.1,pp.141-95.

11. Finance and Growth

- i) Levine R. (1997) "Financial Development and Economic Growth: Views and Agenda" *Journal of Economic Literature*, 35(2) pp688-726.
- ii) Rajan R.G. and L.Zingales (1998) "Financial Dependence and Growth" *American Economic Review*,88 pp559-586.

INDIRA GANDHI INSTITUTE OF DEVELOPMENT RESEARCH

SEMESTER: AUGUST-DECEMBER 2024

COURSE TITLE: SOCIO-ECONOMIC & POLICY ISSUES IN ENERGY AND ENVIRONMENT –II (SPEE-II)

INSTRUCTOR: VINOD KUMAR SHARMA

TEACHING ASSISTANT: AJAY

COURSE DESCRIPTION: Eligibility Only Ph.D. Students (who have studied SPEE-I)

COURSE OBJECTIVES: To create human resources for enhancing academic and research in the Area of Energy & Environment (EE)

COURSE OUTCOMES:

CO1: Learning the basic concepts and generating interest in various topics of EE

CO2: Exposure to Advanced concepts in EE

CO3: Hands on experience of conducting a good quality research in the area of EE

COURSE REQUIREMENTS: Excellent - Computer knowledge; Research Aptitude; English writing / reading / speaking skills; Skills in Mathematical / Statistical Modelling

COURSE CONTENTS:

Introduction: Technological, Social, Economic and Policy issues related to energy and environment; Estimations of the Sustainability Index, EQI, AQI, WQI, GDP, HDI, CBA, EIA and LCA, etc.; Concepts of net zero emission, zero-waste, pollution, emissions, etc.; Effect of Anthropogenic Activities; Effect of Socio-economic determinants on Energy and Environment;

Advance Concepts, Monitoring and Modelling in EE – Concepts of EE Audits; ESG, Green and Climate Financing; EE security and sustainability; CSR and ISR; Energy Scenario for India; Fossil and Non-fossil energy; Monitoring and Modelling of Local Pollution- Air, Water, Solid Waste, Noise, Radiation, Land degradation, etc. Climate Change Modelling.

Analysis of Abatement Measures: Socio-economic and Policy Measures; Comparison of India's efforts with the best practices in the world.

EVALUATION: Based on – 1) Weekly progress on Research Paper (RP) = about 30-20%; 2) Presentation of RP = 30-20% and submission of hard and soft copies of the RP = 40-60%.

REFERENCES:

- George T., Hilary T. and Samuel A(1993): Intergarted Solid Waste Management, McGRAW-Hill Inc.
- H. C. Perkins (1981): Air Pollution, John Willey.
- Handouts, PPTs, and Course Material. provided to the student by the instructor.
- MetCalf and Eddy (2002), Wastewater treatment – collection, treatment and disposal, Tata McGraw Hill Publishers.
- Pearce D., A. Markandya and E. Barbier (1989): Blueprint for a Green Economy, Earthscan Publications Ltd., London.
- Sharma V. K.(1994): Atmospheric Pollution by Aerosols, Scientific Publishers, Jodhpur.
- Sharma Vinod K. and Beukering P. V.(1997): Waste paper Trade and Recycling in India, Scientific Publishers, Jodhpur.
- Sharma Vinod. K (2000): Environmental Problems of Coastal Areas in India, Bookwell, Delhi.
- Sharma Vinod. K (2004): Handbook of Environment, Bookwell, Delhi.
- Sharma Vinod K. (2007): Maharashtra State Development Report, Oxford University Press and Plannaing Commission.
- Thomann, RV (1987): Principles Of Surface Water Quality Modeling and Control: Harper and Row Publishers, NY,, 1987
- Turner R.K., D. Pearce and I. Batman (1994): Environmental Economics, Harvester Wheatsheaf.
- Tietenberg, Tom (2003): Environmental and Natural Resource Economics (6th ed), Addison Wesley, Boston, 2003 .
- Various Policy Reports and Websites of International / National Organizations, suggested by the instructor.

INDIRA GANDHI INSTITUTE OF DEVELOPMENT RESEARCH

SEMESTER: AUGUST-DECEMBER 2024

Course Title: Introduction to Python for Economists Instructor: S. Chandrasekhar, Anjaneya Reddy

Office Hours: By appointment

E-mail: chandra@igidr.ac.in (economics queries)
chandra@igidr.ac.in / areddy@igidr.ac.in (python queries)

Regular Time Slot: Tuesday 16:15-17:45 & 18:00-19:30

Fields: Econometric Theory and Applications, Microeconomics Theory and Applications, Macroeconomics, Finance and Growth, Development Theory and Policy

Background /Course Description: Whether it is in field of applied microeconomics, macroeconomics, or development economics, researchers are using alternate and unstructured datasets. A cursory search on Econlit reveals that the word ‘*google trends*’, ‘*twitter*’, ‘*night lights*’, and ‘*natural language processing*’ appeared in the abstract of 281, 572, 201 and 237 papers respectively. Researchers are looking beyond traditional survey and administrative datasets. Even when administrative data sets are available (for example data from NREGA, Election Commission, eGramSwaraj websites), in most instances knowledge of web scraping, converting from PDF to excel are essential tools for building the dataset.

If you are familiar with STATA or any such statistical software, is it necessary to learn python? Yes, you might want to. First, Python is a useful tool for processing unstructured data into a form amenable for data extraction, data exploration and analysis. Second, it is a commonly used programming language for data science. Third, the world is moving towards open source ‘free’ software.

Learning Outcomes: The material covered in this course will help build your tool kit and aid in economic research.

1. Use Python for undertaking statistical and econometric analysis
2. Learn to work with APIs for data extraction
3. Text processing
4. Converting information which is in PDFs to a database
5. Web scraping
6. Ability to use Python codes available on websites like Github
7. Applications using alternate data
8. Review papers on big data, machine learning and econometrics.

Prerequisites: For those opting to take this course please note that this is a hands-on course where you will have to write code and build datasets. Ideally, those opting for the course should have credited Econometrics I and II.

Attendance: You might struggle to catch up if you miss even one lecture / session. So please try to maintain 100 percent attendance. We are not encouraging anyone to audit or sit in.

Computer Sessions: You need a functional laptop.

Schedule of Lectures: In addition to the Tuesday slot, we will also be having 4 additional lectures a week. Saturday morning is one slot for the additional lectures.

Course Content	
Topic	Number of Lectures
• Overview of Course	2
• Revision of Econometrics Using Simulated Data (<i>Stata</i>)	2
• Revision of Econometrics Using Simulated Data (<i>Python</i>)	2
• Python Basics	4
• PDF to Excel	2
• Working with APIs	2
• In Class Work on API Project	2
• Web Scraping	4
• JSON Format	2
• In Class Work on Web Scraping Project	2
• Introduction to Text Analysis	2
• Econometric Methods & Machine Learning Methods	4
• In Class Exam	2

Evaluation: If you make an honest and complete all components of the course you can be assured of a good grade. Weights for each component are as follows.

- In-class Examinations (2 or 3) 60 points
- Project 1 – API – Data Extraction and Analysis 20 points
- Project 2 - Web Scrape and Presentation of Data 10 points
- Project 3 – Text Cleaning \ Analysis: 10 points

Basis for Grading of Projects – Effort, Creativity, Relevance are important. Project has to be related to Economics, novelty of data and its use or incremental contribution to literature. Need to submit a write up, include summary statistics. Submit all files and codes.

Books

- Florian Heiss and Daniel Brunner - Using Python for Introductory Econometrics (The [e-book](#) is affordable and is worth the price.)
- Wes McKinney - Python for Data Analysis ([Open Access](#))
- Gábor Békés and Gábor Kézdi - Data Analysis for Business, Economics, and Policy, Cambridge University Press, 2021.
- Alan Agresti and Maria Kateri - Foundations of Statistics for Data Scientists: With R and Python ([Python Codes](#))
- Matthew J. Salganik - Bit by Bit: Social Research in the Digital Age

Useful Material

- Kevin Sheppard - [Introduction to Python for Econometrics, Statistics and Data Analysis](#)
- Economics: APIs [University of California Berkley Library](#)

Indira Gandhi Institute of Development Research

Semester: August - December 2024

Course Title: Indian Economy

Instructor: S. Chandrasekhar

Office Hours: By appointment

E-mail: chandra@igidr.ac.in

Regular Time Slot: Tuesday and Thursday 09:30-11:00

Fields: Macroeconomics, Finance and Growth & Development Theory and Policy

Course Objectives: The course (re)examines economic problems, challenge of structural transformation and draws parallels with experience of other countries. Where appropriate, we refer to a theoretical framework. At the end of the course it is expected that you will be conversant with the evolution of the Indian economy post-independence, its institutional framework, competing perspectives on policies, and have a working knowledge of different databases. The course would be useful for those interested in issues relating to Indian economy, current debates, planning to undertake cross-country comparative research or undertake empirical work. Please note that we will not be focusing on impact evaluation. The emphasis is on working with unit level data, reading of review articles /papers that take stock of evidence.

Learning Outcomes:

1. Interpret the linkage (or absence of linkage) from economic growth to structural transformation
2. Situate the Indian experience against that of other countries
3. Discussion of competing perspectives on policies
4. In-depth understanding of data debates, measurement issues, and metrics that are useful for tracking the changing characteristics of Indian economy
5. Working with unit level data

Prerequisites: There will be emphasis on working with data and familiarity with STATA is required. If you decide to work with SAS or R it is fine with me. However, I will be giving the STATA do files and will be using STATA for in class data work. I expect to have at least 10 sessions in the computer lab working with unit level data.

Attendance: You are required to have 85% attendance. You are expected to be conversant with the material. Irregular attendance will affect your grade. I am not encouraging anyone to audit or sit in.

Assignments / Exams: The weights for the different components are **indicative** - Examination: 50 points, Paper: 25 Points, Critique of a Policy: 15 points, Class Participation: 10 points. I plan to front load the hands on data sessions which will be held in the computer lab.

Coverage of Topics

1. India Since 1991 and Benchmarking India vis a vis Rest of the World
 2. Data Debates: Household Consumption Expenditure Survey (HCES): Concepts, Data and Measurement Issues
 3. Data Debates: Periodic Labour Force Survey (PLFS): Concepts, Data and Measurement Issues
 4. Poverty: Concepts, Measures / Indices, Poverty Projections, Changes over Time
 5. Inequality: Concepts, Measures / Indices, Changes over Time
 6. Understanding Financial Sector Reforms Using Flow of Funds Data
 7. Financial Assets and Liabilities of Households
 8. Capital Formation
 9. Structural Transformation
 10. Spatial Distribution of Economic Activity: Measures / Indices, Data and Measurement Issues
 11. Labour Market Outcomes
 12. Urbanization and Migration
 13. Industrial Performance, Export Performance, Industrial and Trade Policy
 14. Decentralization, Fiscal Policy, and Subnational Finance
 15. Working with Unit Level Data - HCES, PLFS, AIDIS, ASUSE, WITS, WBES
- **Reading List and Papers will be made available via google drive.**