

Perspectives on Food Science, Technology, and Innovation Policy

Center for Studies in Science Policy

School of Social Science

Course Title	Perspectives on Food Science, Technology, and Innovation Policy
Course No. & Type	SP401P (MA) <i>Optional</i>
Faculty in charge	Rajbeer Singh
Mode of Evaluation	<ol style="list-style-type: none">1. Term paper or problem on selected area (30%)2. Seminar Presentation on Policy Reviews (20%)3. End Semester Exam (50%)
Credits	4
Instruction Method	Lectures, Workshop, Seminar, Field Visits

Introduction

Food policy discourse world over has undergone drastic transformation since the 1990s. Several issues such as lack of accountability, transparency in policy making, rapid urbanisation, technological change, increasing number of food-related health hazards and hunger have raised concerns in many parts of the world including India. Rising awareness towards these issues is reflected in increasing number of legislations, public litigations, regulatory mechanisms and changing goals of national and international organisations. This has given rise to intertwined concepts of food security, safety and access. As a result, science, technology, and innovation policy has gained heightened significance. Given the complexities involved in the food system, these issues are embedded in many policies with multiple actors, agencies and institutions. The issues of food security, enhancing food production, the wastage reduction of food grain, fruits and vegetables, malnutrition, food procurement, pricing, and public food distribution are significant for the society in India. Additionally, food safety and regulation, new emerging technologies like biotechnology & Nanotechnology, WTO (TRIPS), Food and Fuel, and deployment of Technologies & Innovations may not be central but increasingly important issues in recent times. The role of science, technology and innovation are significant in dealing with preceding issues. The stakeholders of food policy are facing critical questions for ensuring food security and safety for the society without compromising interests of future generations. Science-based regulation and legislation, as well as governance of Food and Nutritional Policy Issues, require transdisciplinary skills and capabilities.

Objectives

The objectives of the course are to acquaint students with different perspectives on food science, technology, and innovation policy. The students will be able to appreciate its importance due to transdisciplinary nature of the course. This would introduce and equip students with Scientific,

Socioeconomic, Political and Environmental, aspects of Food STI Policy in National as well as International contexts. This course encourages critical and evidence-driven analysis of effective policy responses to food security and safety challenges. The course is expected to enable students from different social science as well science streams to appreciate the local, national and international dimensions of policy discourse

A. Farm Systems:

1. *Farm to Fork Food Chain*: A brief introduction to crops production system, livestock system, dairy and food processing system; how these systems evolved recently in the Indian conditions?
2. Definition, Concepts, and Theoretical Approaches: This Unit has focused on creating an understanding of the concept of Farmer and Farming, Innovation and Entrepreneurship, Innovation Process and Systems, Science, Technology and Innovation Policy, Technology Transfer, Technology Commercialization, Technology Adoption, Technology Diffusion.
3. Food Policy processes (domestic and international), typologies of policy initiatives, Food Safety and Standard Authority of India (FSSAI) Act and Its role in regulation and policy; the important factors affecting food safety, analyze and discuss the cases related to food controversies, [Eg. Maggi, Minimum residue level in processed food and drinks], role of social, print and electronic media in shaping the response of stakeholders. [Policy expert lecture]
4. Farm level Policy issues and challenges: Productivity Enhancement Issues, Fertilizer and Pesticide usage and subsidy, water and irrigation, Soil and Seed, Animal and Poultry Feed, Farm mechanization, issues of sustainability at the farm, [Practitioner's Seminar/lecture]
5. The Research and Development Policy in Agriculture and Food Process sectors. How to set priority for R& D investment? How to enhance effectiveness and outcomes of R&D and Innovation. Research, Technology and Innovation in Food Production and Processing; Modern science and technology and support to research and technology development;
Farmer's as researchers and company owners, Farmer's right on IPR and Seed varieties.
6. Science and Technology in Food Policy: a) how science influences the policy agenda, and how policy debates influence the scientific agenda; b) the scientific underpinnings of food and nutrition policies; c) how empirical findings in scientific research and operational programming make their way into policy and law; d) how science-based standards and norms emerge.
7. Food, Energy, Water Nexus and Land Policies. How water Policy influence the food production? Why would land policies be crucial factors in Food security in India?

B- Processing, Market and Sustainability

8. Post-harvest Challenges: Understanding law and regulatory mechanisms for farm produce, How to address post-harvest losses? How to add value to farmers' produce on the farm and beyond?
9. The role of Science and Technology in Procurement, Storage, and Pricing of Food produce. Policy initiatives on Storage and Distribution.
10. Farm gate policies, laws, and regulatory mechanisms, issues of market access to farmers. [expert seminar/lecture]
11. Indian food processing Industry: This unit discusses the policies, and strategies for food processing,

modernization and technology adoption and business model innovations for enhancing the scope of processing of agro-food produce.

12. Recent Technological Changes and its implication for food system: Green Revolution Technologies Vs Modern GM Technologies, Biotechnology and its role in food system, issue around Genetically Modified Food, the pros and cons of two (organic farming and genetic engineering) divergent approaches to meeting food demand.
13. Environmental Issues and Sustainability of Food systems: Technologies deployed for Agriculture and Food Production; Social movements and scientific controversies on Food; the impacts and implications of Chemicals and Fertilizers used in Food production. ;
14. Different Agricultural and Food processing revolutions and their impact on policy process in recent times. Cases of Green, Brown, Blue, and Yellow revolutions.

C- International Dimensions

15. International Agreements and Implications for Food Security: GATT, WTO, impact on exports and imports of food, challenges for Indian farmers and exporter under the new global system. [expert seminar/lecture]
16. Food Security Approaches in India, China, EU, and US; Comparative Understanding of fundamental principles adopted for Food Security, National Food Security Act 2013, National Food Security Mission (NFSM); Implications of Food Security approaches of India; Sustainability and Food Security issues (discuss two cases)

Essential Readings:

- Allouche, J.; Middleton C. and Gyawali, D. (2015). Technical veil, hidden politics: Interrogating the power linkages behind the nexus. *Water Alternatives* 8(1): 610-626
- Biswas, P. K., et al (2015). *Performance of Indian Food Products Industry: A Study of Structure, Innovation and Growth, 2000 – 2010*. National Institute of Science Technology and Development Studies, New Delhi
- Bose, P., & van der Meulen, B. (2014). The Law to End Hunger Now: Food Sovereignty and Genetically Modified Crops in Tribal India--A Socio-Legal Analysis. *Penn State Law Review*, 118(4), 893
- Brahmanand, P. S., Kumar, A., Ghosh, S., Chowdhury, S. R., Singandhupe, R. B., Singh, R., & Behera, M. S. (2013). Challenges to food security in India. *Current Science* (00113891), 104(7), 841-846.
- Buchan, J. (2007). India's Food Policy Paradox. *Undercurrent*, 4(1), 1-7
- Epstein, J. (2014). Scientizing Food Safety: Resistance, Acquiescence, and Localization in India. *Law & Society Review*, 48(4), 893-920. doi:10.1111/lasr.12106
- FSSAI (2006), Food Safety and Standards Act, 2006.
- FSSAR (2011), Food Safety and Standards Rules, 2011
- Herring, R. J. (2015). State science, risk and agricultural biotechnology: Bt cotton to Bt Brinjal in India. *Journal Of Peasant Studies*, 42(1), 159. doi:10.1080/03066150.2014.951835
- Kumar, P. (2010). Structure and Performance of Food Processing Industry in India *Journal of Indian School of Political Economy*, Vol. 22 Nos.1-4, pp.127-163.

Khush, G. S. (2015). Punjab's Water Woes and India's Food Security. *Journal Of Crop Improvement*, 29(1), 1. doi:10.1080/15427528.2015.997655

Narayanan S. Food Security in India: The Imperative and Its Challenges. *Asia & The Pacific Policy Studies* [serial online]. January 2015;2(1):197

NFSA (2013) National Food Security Act 2013.

NLP (2013), National Livestock Policy 2013, Ministry of Agriculture and Farmer Welfare. Patel, K., Guenther, D., Wiebe, K., & Seburn, R. (2014). Promoting food security and livelihoods for urban poor through the informal sector: a case study of street food vendors in Madurai, Tamil Nadu, India. *Food Security*, 6(6), 861. doi:10.1007/s12571-014-0391-z

Plahe, J. K. (2009). The Implications of India's Amended Patent Regime: stripping away food security and farmers' rights?. *Third World Quarterly*, 30(6), 1197-1213. doi:10.1080/01436590903037499

Qaim, M., & Kouser, S. (2013). Genetically Modified Crops and Food Security. *Plos ONE*, 8(6), 1-7. doi:10.1371/journal.pone.0064879

Ruane, J., & Sonnino, A. (2011). Agricultural biotechnologies in developing countries and their possible contribution to food security. *Journal Of Biotechnology*, 156 (Special issue: IBS 2010 - Industrial Biotechnology), 356-363. doi:10.1016/j.jbiotec.2011.06.013

Swaminathan, M., & Vepa, S. S. (2012). How Can India Help Prevent Food Price Volatility?. *IDS Bulletin*, 4384-91. doi:10.1111/j.1759-5436.2012.00350.x

Yu, W., Elleby, C., & Zobbe, H. (2015). Food security policies in India and China: implications for national and global food security. *Food Security*, 7(2), 405. doi:10.1007/s12571-015-0432-2

Important Journals

1. *Food Policy*, Elsevier
2. *Journal of Food Science and Technology*, Springer

Important links

1. NISTADS, CSIR, New Delhi www.nistads.res.in
2. STEPS Centre/ Science Policy Research Unit (SPRU), University of Sussex www.steps-centre.org/
<http://www.sussex.ac.uk/spru/>
3. <http://www.fssai.gov.in/>
4. <http://dfpd.nic.in/nfsa-act.htm>
5. <http://www.mofpi.nic.in/>
6. <http://dahd.nic.in/>