Public Systems Lab
सार्वजनिक तंत्र प्रयोगशाला

Impacting Public Systems

Through State-of-the-art Technologies

ARISE !
AWAKE !
AND STOP
NOT UNTIL
THE GOAL
IS REACHED
Swami Vivekananda

About Public Systems Lab

The Public Systems Lab collaborates with governments, private sectors, and multilateral organizations to develop sustainable solutions for complex public sector challenges. Using operations research, data science, and analytics to address issues in various domains such as Food Systems, Transportation, and Health. The lab's commitment is to support Sustainable Development Goals.

Our Vision

Our goal is to become a world leader in offering innovative, sustainable, and scalable solutions that improve the effectiveness and efficiency of public systems. We aim to enhance community access to and utilization of these systems.

Our Mission

Our mission is to promote the well-being of diverse communities nationwide through scientific models.

Objectives

We conduct research and provide customized solutions to enhance government systems

We offer training sessions, webinars, and workshops to enhance stakeholder skills

We develop and implement cutting-edge solutions to optimize public system utilization

We also support start-ups and entrepreneurship to align with PSL's objectives

Our Partner

The United Nations World Food Programme (UNWFP) has been awarded the Nobel Peace Prize for 2020. As a leading humanitarian organization, WFP is committed to saving lives during emergency situations and providing food assistance to vulnerable populations to ensure they have access to nutritious food.

Through sustainable development and capacity building, the WFP aims to prevent future hunger and reduce malnutrition. With global expertise in food systems, social protection, supply chain and logistics, WFP has established strong partnerships with various ministries and government bodies in India.

Our Team

Our people include officials, experts, and researchers from academia, international government bodies, and private organizations, all working together with multiple stakeholders.

Prof. Nomesh Bolia
Director
Public Systems Lab

Prof. SG Deshmukh
Area Expert
Public Systems Lab

Elisabeth Faure
Country Director
WFP - India

Ankit Sood
Head- Social Protection & Supply Chain, *WFP - India*

Prof. Sunil Jha
Area Expert
Public Systems Lab

Domains of Engagement

The lab focusses on SDG-2 goals with projects involving Operations Research, Product Development, Data-Based Innovations & Analysis

Food Systems

Health

Law & Justice

Governance

Energy & Environment

Operations Research

Data Science

Methodology

Economics & Management

Indian Knowledge System

Artificial Intelligence

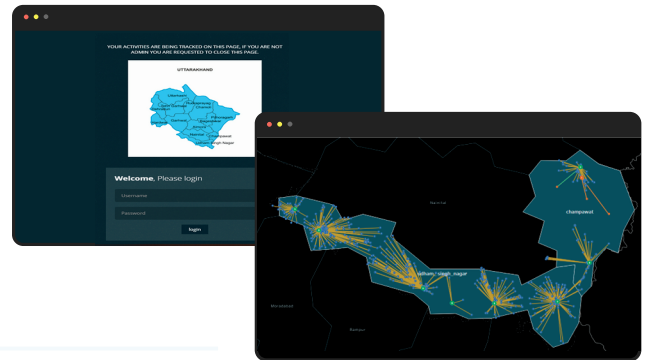## Food grain supply chain optimization for all Indian states

Successful implementation of the project will reduce the cost of food grain transportation and ensure adequate safety stocks. Operations Research based mathematical models are developed along with implementable tools to satisfy the demand requirements.

Project highlights:
- ✔ Supply chain optimization across the country (31 states/UTs), sponsored by Dept. of Food and Public Distribution (DFPD), GoI.
- ✔ Monitoring, implementation and feedback by DFPD officials, supported by PSL
- ✔ Development and implementation of optimization for inter-state movement by Food Corporation of India (FCI)

Outcomes:
- ✔ Significant reduction in transport cost
- ✔ Better utilization of warehouses
- ✔ User friendly Dispatch plans
- ✔ Clear Warehouse supply zones

PSL Millet Systems

In the spirit of the International Year of Millets, the PSL is also undertaking projects with the objective of increasing demand and consumption, improving supply chain, boosting awareness and supporting millet-based value chains.

Thali Problem: Aimed at optimally including millets in daily meal. OR-based models have been developed for Odisha. Results indicate that only upon the inclusion of millets all nutritional requirements can be satisfied

Nudge Study: Randomized Controlled Trial (RCT) to study the impact of nudges in promoting millet purchasing behavior of Public Distribution System (PDS) consumers

Promotional strategies: Design, pilot/execution of digital and IEC strategies across the country to increase awareness on the benefits of millets to individuals, farmers and the entire system.

Our Projects

Smart Warehouse

The internet of things (IoT) based smart warehouse is highly effective in storage management and will ensure rightful utilization of food grains through structured monitoring of various parameters in real time. It aims to achieve a significant reduction of food wastage caused due to the drawbacks of traditional storage practices.

---------- Features ----------

Centralised Monitoring through mobile-based apps

Alternate Storage Mechanism through Mobile Storage Units (MSU)

Capacity Building for warehouse & post-harvest management

Sustainable Development Goals 2 Dashboard

With an objective to visualize the state, district and sub-district data indicators for SDG 2 monitoring, an analytics based dashboard has been developed in order to enable evidence-based policymaking and support the efforts of Governments in achieving food and nutrition security. It will enable the identification of vulnerable hot-spots for strategic planning and targeted action towards achieving 'Zero Hunger'.

Bus Operations Toolkit [BOT]

By developing a mathematical model based on Operations Research and Analytics, the project optimized bus scheduling at the Bengaluru Metropolitan Transport Corporation (BMTC). Overlapping trips of buses are reduced, redundant bus trips withdrawn, effective redeployment of buses carried out and limited waiting time of passengers.

As an outcome beyond output of this project, the BMTC constituted 'Operations Research Group' which will take in recommendations from IIT Delhi.

Outcomes

Positively impact emission control

Attract more ridership

Facilitate shift to public transport
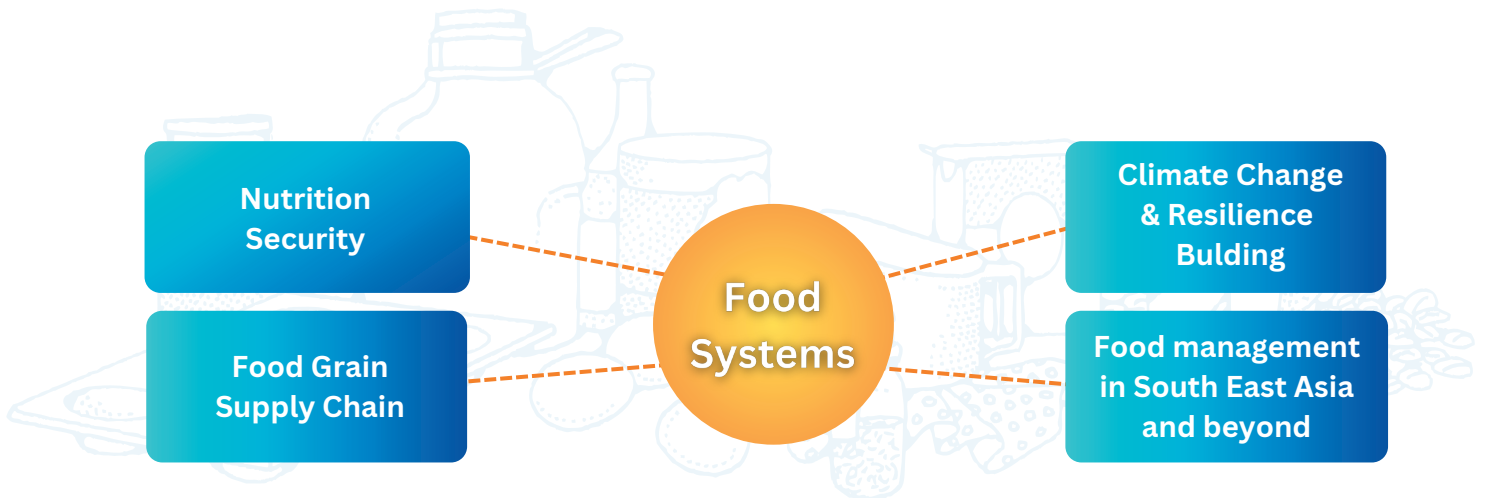

Winner - Smart Move Innovative Urban Mobility Challenge, GoI

Management and Innovations of Food Systems

- ✓ Planning, Reformation and Optimization of state TPDS programmes
- ✓ Millet systems focused on demand, consumption, awareness & supply-chain
- ✓ Analysis and Improvement of Food Grain Supply Chains and allied Systems
- ✓ Food management and planning in South east Asia and beyond
- ✓ Efficiency in food programmes and nutritional systems
- ✓ Climate change and resilience building for food and nutrition security

Nutrition Security

Food Grain Supply Chain

Food Systems

Climate Change & Resilience Bulding

Food management in South East Asia and beyond

UPI-based FinTech

A Unified Payment Interface (UPI) based fintech solution for the world proposed initially for food and cash transfers with major components such as:

- ✓ Transaction Processing Apps (TPAP)/ digital wallets based on UPI rails
- ✓ Digitally enabled beneficiary onboarding using AI-ML
- ✓ Onboard and enable beneficiaries and merchants
- ✓ Systems to accept payments without data connectivity

Outcomes

Avoid operational leakages

Verify beneficiary identity

Ensure beneficiary eligibility

Capacity Building

Public Systems Fellowship (PSF) Programme

- ✓ Study, model and analyse systems
- ✓ Identify issues using Operations Research & multidisciplinary approaches
- ✓ Develop and deploy solutions with department stakeholders
- ✓ Fellows to be recruited and trained by the PSL

The fellowship will lead to more effective public systems for all, sustained engagement with key stakeholder and production of theoretical and applied knowledge.

OR-based courses for Government officers

Operations Research based courses for Foundational and In-Service Trainings of Government Officials. Sample content:

1. What is Operations Research
2. Role of OR in administration and governance
3. Benefits and Need of OR in 'Digital India'

Public Systems Network

The PSL envisions to build a network of labs/institutions that engages in research-based innovations and development of optimal solutions for improving the effectiveness of public systems in India. The PSL at IIT Delhi will facilitate the necessary expertise, data and networking.
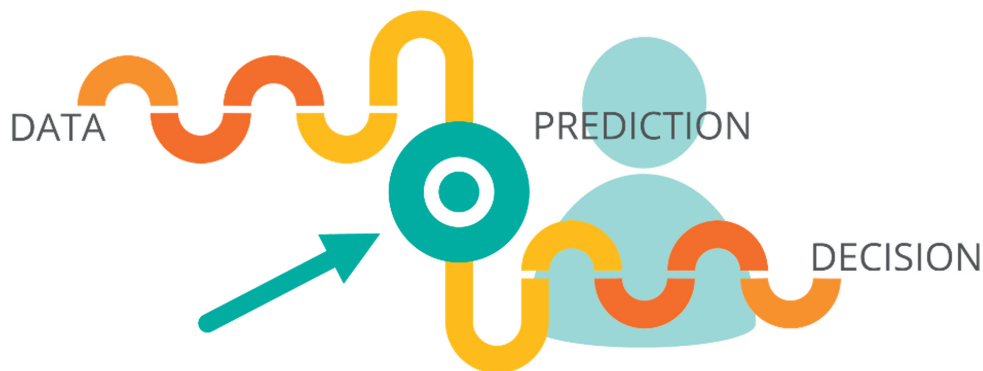
Decision Support System (DSS) for
District Magistrates and other Govt offices

Aimed at streamlining the structural lacunae present across administrative functioning of District Magistrates and other government officials.

Key Features :
- User friendly system for managing meetings and committees
- Quick & easy decision making through alerts, learnings from activities, others
- Integrated dashboard for visualisation of all schemes
- Easy tracking of compliance status for better visibility and monitoring
- Powered by Operations Research, Analytics, Artificial Intelligence

COP Emission Targets

The PSL, through its supply chain optimization projects, aims to address emission targets for India and beyond in line with the Conference of Parties (COP)

- Identify opportunities and solutions to enable governments to achieve COP targets for emission control
- Work with governments globally on logistics optimization to help them achieve their COP target.

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