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Information System for Safety Net Implementation

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Abstract

Economic liberalization, which is essential for accelerated growth of the national economy, can succeed in the long run only if appropriate safety nets are designed to safeguard the well-being of the people who are affected in the short term including the people below the poverty line and the people displaced from their jobs due to increasing modernization. In the case of food security, the variability in food supplies and transportation bottlenecks aggravate and compound the insecurity caused by liberalization. To make liberalization sustainable, the Government in particular and the social and economic functionaries in general have to carefully design and implement a food security system with local, state-wise, national and international linkages. The Public Distribution System, especially, should be fast reactive to remedy the insecure food supplies for segments of the population. The reaction time constants can be minimised by working out a computer-communication network based information system spread throughout the country. A design of such an information system has been evolved. The NICNET based online database supporting the Public Distribution System implemented throughout the country has given a Management Information System. As a support to the Food Corporation of India, NIC and FCI have together grown a Grain Management Information System concerning storage, quality control, transportation, stocks/offtake monitoring, etc. New features are being added for orienting the system for developing a Management Information System for decision support at the national level, State level and local level. A Food Grain Movement Operations Research Model has been developed along with a Multi-objective Decision Support System for PDS and RPDS. As the food security relief management problem is spacial in nature, a Distributed Control System Theoretic Model for Relief Management is suggested for maximising food security of a population affected by variability in food supplies. The associated geographic information system in transportation planning is also highlighted.

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1. INTRODUCTION

Defining the food security as the capacity of a country, State, District or house-hold to meet the target levels of consumption on a year to year basis, information systems are required to quantify this capacity at periodic intervals. This in turn, would require databases for periodically estimating the adequacy of the aggregate food supply to meet the requirements of the population, factors and modalities required to assure uninterrupted food supply and to determine whether the food supply is amenable to various segments of the populace. The models for the target levels of consumption, may in turn, require quantification of the minimum recommended level on the basis of nutritional criteria. As food security can be regarded as a problem of short term variability, the database required for targetting this variability has to be more dynamic and updated very frequently. Short term variability of food supplies, may in turn, require information on the effect of the weather on the size of the harvest, effect of natural disasters, etc. In order to reduce the cost of importing adequate food for stabilising domestic supplies, world price information has to be periodically obtained. Despite stability in the aggregate for the country as a whole, certain segments of the population are facing insecurity of food supplies. This may be a local famine or it may the priority changes in distribution patterns for economies in transition to market systems. Another effect of liberalisation may be the fluctuation in real income within the country leading to consumption instability among weaker sections of the population. This will, in turn, alter the food consumption patterns of the vulnerable sections of the society. If fluctuations in the disposable income of the country could be smoothened, it is possible to attain stable food consumption at the national level and perhaps even for a large portion of the population. However, the weaker sections may still require the benefits of the Public Distribution System (PDS) or market oriented safety-net arrangements with Govenment support.

Accelerated growth of the national economy can be accomplished by carefully worked out economic liberalisation. The process of liberalisation can be sustained in the long run only when appropriate safetynets are provided to safeguard the well being of the people who are affected in the short term. Such people may be those who are below the poverty line or people who are displaced from their jobs due to increasing automation and modernisation. The variability in food supply described above as well as transportation bottlenecks tend to aggravate the insecurity caused by liberalisation. For sustainable liberalisation, the Government in particular and social and economic functionaries in general, will be required to carefully design and implement a food security system with local, State, national and international linkages. For example, the types of technologies for rain-fed crops that can reduce costs and increase yields, would require comprehensive information systems on such technologies and database of experience in using them in various parts of the country. Further, the infrastructure in agriculturally lagging regions have not improved adequately due to failure of policies. These two factors have resulted in a stagnant or declining per capita food production in several States except in Punjab, Haryana and Uttar Pradesh. Trnsportation bottlenecks and lack of movement optimisation has resulted in the failure of the PDS to transfer food grains from the surplus States like Punjab, Haryana and Uttar Padesh to deficit States like Madhya Pradesh, Orissa and Bihar. As the poor in States like Kerala, Tamil Nadu and Gujarat have tended to depend on PDS supplies more and more, any variability in such supplies will cause considerable hardships. Certain constraints like non-availability of

appropriate technologies, inadequate public investment in irrigation infrastructure and non-increasing private investment in agriculture in various districts, call for adoption of constrained optimisation models.

Pursell and Gulati [1] (1993) have argued that it is possible to limit the role of the Government to providing only the safetynet to the poor affected in the transition brought about by market reforms which eliminates controls on agriculture in domestic market and external trade. With the reforms resulting in 15 to 20 percent increase in the overall level of agricultural prices and implementation of the Dunkel proposals by various food surplus countries further tending to increase these prices, it is likely that unstable world prices and increasing mal-adjustments may be felt by the weaker sections of the society. This would call for a highly optimised deployment of the safetynet in terms of the quantum of support, its distribution without transmission loss and information support for such optimisation. Hence, for the PDS to be fast reactive, the reaction time constant will have to be minimised by organising the PDS around a computer-communication network based information system spread throughout the country, especially linking the vulnerable areas. The NICNET Online Database supporting the PDS throughout the country has given a Management Information System (MIS) for demand for and allocation of, PDS commodities, PDS prices, details of Fair Price Shops, etc. Food Grain Movement Operations Model developed along with multi object decision support system for PDS is described in Section IV. The spacial nature of the food security relief management require the development of a Distributed Control System Theoretic Model for Relief Management for maximising the food security of a population affected by variability in food supplies. This and associated GIS frame-work are highlighted in Sections V and VI.

2. INFORMATICS DESIGN OF PDS/RPDS AND SAFETYNETS - IDENTIFICATION OF DESCRIPTORS

The operational system efficiency of a PDS oriented towards price control and poverty alleviation is based on the following conditionalities:

i) The consumption needs and typification of beneficiaries decides the commodity list.

ii) With appreciable real income effect, the entitlement scale has to be at adequate levels.

iii) To ensure adequate distribution, Government procurement of sufficient quantity should be comparable to net production of essential commodities.

iv) A systemic approach to the identification of efficient procedure for issue of ration cards to targetted consumers should be ensured.

v) PDS issue prices should be relatively well below the open market price.

The Information implication of the above five conditionalities are important. The information descriptors should include, commodity coverage, quantification of consumption needs, database of profile of beneficiaries, quantification of scale of entitlement, monitoring of rise in prices, competition of real costs underlying the utilisation of the distribution system, commodity supply position, net production of essential commodities, socio-economic status of various beneficiaries, database on ration cards issued, monitoring open market prices, database on location of retail outlets, etc.

Each of the above parameters identified, can in turn be broken up into the sub-descriptors. For example, for the database on retail outlet network, in turn, will have sub-descriptors like the following: Retail outlet locations, retail licences issued, stock position, re-ordering criteria, quality of comodities, profitability of the Fair Price Shops, etc.

The above descriptors are basically at the micro level. PDS modelling and analysis require databases on macro level factors also. For example, the supplies necessary for the PDS will depend on the population covered, their nutritional level requirements and inflation. Ensuring this would call for constantly updated information of macro level factors like entitlement of data on tartget populations, patterns of essential consumption of these targetted populations, tastes and food habits of the various target populations and the flow profile of essential commodities to those who are in real need of the subsidy.

Broad information descriptors for Administrative Data Processing (ADP) and Decision Support System (DSS) at the level of the Central Government, State/UT Governments, Districts and Sub-districts are given below:

LIST OF INFORMATION DESCRIPTORS

(Based on the PDS Model of Kabra & Ittyerah)[2]

Level	ADP	DSS
Central Government	1. Commodity procurement & Imports	1. Commodity coverage
	2. Procurement Price. Issue Price	2. Supply Inventries
	3. PDS Design parameters	3. Target Population details
	4. Allotments to States	4. Open Market price
		5. Subsidty details

State Governments	1. Receipts of Central Allocation	1. Estimates of Needs
	2. Procurement in the state	2. Warehousing details
	3. Purchases from other States	3. Intra-state procurement
	4. Warehousing/Silo status/depot status etc.	4. Inter-state procurements
	5. FPS details	5. Open market price relativeto issue price
	6. Consumer issue price	6. Commodity coverage
	7. Allotments to District	7. Periodicity & Regularity
	8. Transportation details	8. Ration scale
		9. Ration Cards database
		10. FPS details: Location, performance, margin, etc.
		11. Transportation Logistics and economics
Distirict & Sub-district Administration	1. Warehousing/Lifting stocks	1. Quality & Quantity of delivery
	2. Issue of ration cards	2. Storage by FPS
	3. FPS details	3. Periodicity & regularity
	4. Offtake by FPS	4. Reserve Stocks & Inventories
	5. Enforcement, Inspection and vigilance	5. Monitoring of FPS

Information system implications of PDS and RPDS should also be designed in terms of those helping the design of delivery systems, estimating the supply trends, monitoring the buffer stocks, calculating the subsidies and supporting the evaluation and analysis studies for feed back correction. These will be briefly touched upon below:

The Food Corporation of India (FCI) purchases, stores and transports the commodities to the Central Godowns. The State Governments, in turn, lift the comodities from the Central Godown and distribute them through Fair Price Shop networks. For efficient operation of such a delivery system, there is need for development of an online information system over computer-communication networks, topologically matching the trunk lines and arteries of distribution. The dynamic comodity flow information over this network, as a function of time, requires advance tools of distributed relational database management systems as is available over NICNET.

The supply trends will be both at the macro level and the micro level. The response of Government supply to fluctuations in production, so that it becomes higher in drought years than during normal years, is required to be consciously designed on the basis of information about the fluctuations as a time series and from computer-aided forecasts. Further, the Government supply should counter-compensate the inflation. An increase in inflation is required to be counter-compensated by a relative decrease in commodity prices. For this also, a network based online information system throughout the country is essential to be maintained in a distributed RDBMS.

Monitoring buffer stock position for creating a buffer stock database in various silos and godowns is an essential step in the distribution optimisation. Buffer stocks in a distribution network, play the same role as the capacitors in an electronic circuit. They store when in excess and discharge when there is deficit around. The PDS and RPDS distribution system is a clear example of a complex feedback control system. The lack of intuition concerning how feed back control systems work and how they can be modelled for system optimisation are possible partial reasons for failure of PDS systems in the past. Adhoc hunches, rather than characterisation of the system in terms of feedback control parameters and system optimisation, governed decision making in the past. With commodity movement of several thousands of crores of rupees involved every year, a well worked out feedback control system model is essential to save the PDS and RPDS from chronic failures in the future. Such models require regular information inputs, both deterministic and statistical. The present structure of FCI is not conducive to the implementation of such models. NIC has already developed such models for FCI, though however, the management of FCI inspite of their sincerity in implementation could not do so because of organisational structural deficiencies. A major overhaul of the FCI structure is essential before successful implementation of large scale feed back system models.

The optimum price policy is based on the following conflicting objectives:

i) Provision of adequately remunerative price to producers.

ii) Commodities are made available to various target groups at affordable prices.

iii) Use of buffer stocks for the 'capacitor effect'

For a systemic optimisation incorporating the above three objectives in a weighted objective function subject to various constraints, the following subset variables are utilised: Administered consumer prices, irrigation charges, fertilizer price, electricity tarrif, etc. which, in various combinations, help to keep the input price low. According to a paper by Hanumantha Rao[3](1994), the total input subsidies on this increased from Rs. 10 billion in 1980-81 to about Rs. 75 billion towards the end of that decade. The input subsidies during the beginning of this period which amounted to about one-third of the total Plan expenditure on Agriculture, Irrigation and Sub-area programmes, increased to about 90 perent towards the end of this decade. According to him, these input subsidies are responsible for the current trend of decline in real expenditure in agriculture and growing budgetary deficits. Such findings partly point to the paucity of information and modelling support to decision making in the past.

Evolution of studies of impact of PDS necessarily requires a good database. So far, the only database available was the National Sample Survey Organization[4] (NSSO) data on PDS for the year 1986-87 along with the records available on Food and Civil Supplies. Whereas the NSS data is the best that can be culled out in the past, a number of new initiatives, especially by NIC, is under way which is likely to improve the situation in the future.

In addition to the above information descriptors, an elaborate exercise carried out by Y.K. Alagh [5,6] (1994, 1995) has brought out a preliminary illustrative list of indicators that are required for a national level food security information system. He has identified the following indicators for short run decisions:

i) Estimate of Public Stocks of food items

ii) Price trends of food items and comparison with earlier years

iii) Estimate of private traders' stocks of food items

iv) Crop output expectations

v) International price trends

vi) Short run domestic demand trends/fluctuations in income and impact.

vii) Weather fluctuations/disasters/food import indicators

viii) Estimates of infrastructure relating to food procurement

ix) Agricultural credit for trade and farm operations

x) Government decisions and support prices in relation to market trends/costs of production.

xi) Trends in nutritionally risk segments of the population

xii) Tarrif/quantity restrictions on food movement

xiii) Major technological achievements relating to food availability/ transport/processing

xiv) Food aid indicators.

The indicators at the national level for the medium term have been given by him as follows:

i) Expected increase in agricultural potential in future

ii) Expected trends in food crops acreages

iii) Expected increase in demand for food items

iv) Expected change and price environment for agricultural sector

v) Expected policy adjustments in economic incentives to agriculture.

vi) Expected development in agricultural markets/storage

vii) Impact of economic policies and food demand

viii) Likely trends in nutritionally risk populations

ix) International price trends

x) Major changes in regional demand/configurations.

3. NICNET BASED PDS AND RPDS DISTRIBUTED DATABASE

Keeping all the parameters described in the previous section in view, a distributed database is being evolved by NIC over its nation-wide computer-communication network, NICNET. The basic design of the system was carried out by the Civil Supplies Informatics Division of NIC [7] which has brought out a few divisional reports on this topic. A brief outline is given below.

Under the PDS, the Central Government procures and supplies six essential commodities - Wheat, Rice, Sugar, Edible Oil, Kerosene, and Soft Coke. NIC has developed the following packages for supporting the decision making in the Ministry of Civil Supplies, Consumer Affairs and Public Distribution.

i) **MIS for Demand and Allocation for PDS Commodities** - This database maintains the demand information as proposed by the State Governments, allocation done by the Central pool and the quantity lifted by the State Governments. This database is updated monthly. Monthly reports are generated and sent to the Office of the Prime Minister. A number of other reports supporting decision making at various frequencies or on demand basis are also generated.

ii) **MIS for Allocation and Offtake for RPDS** - This database maintains information on allocation system by the Central pool, quantity lifted by the State Governments, the number of Fair Price Shops for RPDS, the number of Ration Cards, additions/deletions information, de-hoarding information and the population covered under RPDS. Information on the assistance given by the Central Government for the construction of Godowns and Purchase of Mobile Vans are also maintained separately. The database is updated monthly for allocation and offtake while on a fortnightly basis the reports are generated and sent to PMO on Ration cards, FPS, assistance etc.

iii) **MIS on PDS Prices** - This database maintains State-wise information on the prices of Wheat and Rice for PDS and RPDS.

iv) **MIS on FPS** - This database maintains information on state-wise FPS under various agencies and is updated monthly.

v) **Procurement Database** - FCI and State Governments have field level agencies for undertaking procurement operations of food grains. About 8000 procurement centres for Wheat are operated by FCI and other agencies. Information on the following parameters are collected in every district unit overseeing the procurement operation.

- Quantity of grain arrived in the Mandi/Purchase Centre during the day
- Quantity procured by various agencies/traders
- Prevailing minimum/maximum prices for sale of Grain during the day.

At present much of the Mandi figures are collated at the district FCI/State Govenment offices manually and thereafter sent to the Regional Office. Some of the field offices of FCI/State Government are using the NICNET facility available in various District Headquarters for entering their operational data.

vii) **Storage Information System** - An elaborate information system has been planned by NIC for collecting information about the status of grains in silos, godowns and Cover and Plinth (CAP) depots. The quantity of storage space available at a point in time is a key information component apart from the type and quality of grains stored. Collection and storage of quality control information has also been attempted.

viii) **Transportation Information System** - The grains procured/imported is required to be transported to target regions all through the year. About 190 lakh tonnes of grains costing Rs. 10,000 crores are moved every year by FCI alone mostly by Rail involving 0.6 million 4-wheeler equivalent wagons. The movement information is required to be correlated with the stock information for which pilot projects have been carried out over NICNET. Large scale correlation over the length and breadth of the country has been proposed by NIC to FCI. An elaborate software has been developed and structured and the correlated databases have been optimised.

ix) **Stocks/offtake Monitoring Information System** - Database on depot-wise activity profile consisting of stock/offtake is found to be important. The broad parameters to be monitored for this database module are: Stocks of various grains, Inflows from other FCI/State depots, Issues to various schemes, Outflow to other FCI/State depots and Closing stocks. Release orders for Foodgrains/Sugar are issued by the Central Government and the State Governments take delivery from FCI depots against these release orders. Subject to other restrictions, transparency of FCI stock data would be helpful to the State Governments for planning their lifting/movement operations as well. It is for this reason that a distributed database on this has been designed and is proposed to be implemented nation-wide.

NIC has been providing active computerisation and NICNET support for monitoring PDS operations at the Centre. Since the Ministry of Food and the Ministry of Civil Supplies are both concerned with various aspects of PDS operations, common or correlatory databases are maintained wherever necessary, to provide uptodate information. Since NIC has developed the computer infrastructure from the District level upwards, it is feasible to undertake intensive but appropriate monitoring of PDS operations at the District, the State and the Central levels. The PDS monitoring system utilising NICNET for capture of the following basic data from the District to the State and the State to the Centre, consists of the following:

- Demand, Allocation and Lifting of essential commodities
- Number and coverage of Fair Price Shops
- Number of Ration Cards issued, Units and Cards cancelled
- End Retail Prices
- Scale of rationing
- Enforcement activities

The State Governments are aleady utilising NICNET to send the fortnightly status reports and also the details from the blocks covered to the Centre. In addition, the State Governments are utilising NICNET for their own monitoring and implementation information between the districts and the State capitals.

Many of the NIC State Centres have been assisting the State Administration in the implementation of PDS and RPDS. Some of the typical State-wise databases developed by NIC which are in full scale operation are given below:

Arunachal Pradesh:

- Reports from Districts about storage of Essential Commodities
- Messages regarding Truck requisitioning

- Stocks of Food Grains
- Reports for Revamped PDS
- Allotment and lifting of Essential commodities

Himachal Pradesh:

- Fair Price Shops Monitoring
- Godown Monitoring
- Licenses/Raids/Inspections monitoring
- Open market rates monitoring

Kerala

- Monitoring of PDS at District & Taluk level
- Allocation, lifting and offtake details of Rice, Wheat, Sugar and Kerosene
- Details of inspections/actions and confiscation details
- Information on authorised dealers
- Information of license details of Kerosene wholesalers

Madhya Pradesh

- Tehsilwise lifting position related to wheat, rice and sugar
- Inspection of Fair Price Shops
- Enforcement Activities
- Vigilance Activities
- Details of FPS
- Prices of essential commodities

Meghalaya:

- Details of FPS
- Allocation of Foodgrains to FPS

- Elimination of Bogus Cards
- Monitoring price levels
- Enforcement activities
- Revamped PDS
- Stocks, Allocation & Lifting
- Scale of Rationing

Tamil Nadu:

- Allocation and Lifting Taluk-wise/Week-wise
- Price Monitoring system
- Kerosene Distribution system
- Revamped PDS
- Enforcement activities
- MIS on PDS-FAIR Price Shopwise details

Tripura:

- Procurement and Distribution
- Distribution of essential commodities
- Prices of essential commodities.

In the existing information system developed and operationalised by NIC with the cooperation of Central Government and State Governments, the following draw-backs have been noticed which are being rectified progessively:

- Time lag in availability of data
- Lack of aggregation and integration
- Lack of analytical reports and good presentation
- Excessive dependance on manual intervention & conventional modes of communication
- Lack of exploration of cost-effective means for communications/control

For remedying the above deficiencies, the following course of action has been suggested by the NIC Division:

1. The information on crop prospects(Area/Production estimates) could be collected from the accredited statistical agency in every district and refined subject to availability of additional data.

2. To begin with, the primary data on stocks and issues from FCI/State Government depots could be collected at each of the 450 and odd NIC district centres - the load on an NIC Centre on an average would work out to collection of data upto 10 depots on a daily basis. The distribution of FCI/State depots among the revenue districts being highly uneven, the above averages are representative only. This information will be collected by the District collectorate and passed on to NIC District Centre for transmission. Data on other modules of the Grain Management system could be added subsequently.

3. A mandate has to go from the office of the Chief Secretaries to all the District Collectors that they should make available the required data on Stocks/Offtake for FCI/State Government depots, in the prescribed proforma, to the NIC authorised agency in the district.

4. The data so collected has to be entered in the identified district Computer Centres and subsequently transferred to NICNET by the NIC accredited agency.

5. The data available through NIC would be suitably processed and made available in an online MIS by the NIC Food and Civil Supplies Information Division.

4. COMPUTER NETWORK BASED MODELS FOR PDS AND RPDS

As mentioned in the foregoing Section, the problem of procurement and distribution optimisation is a highly complex optimal feed back control system. Without detailed enumeration of parameters and their interactions, accurate quantification and detailed characterisation of the feedback control system, there is no way by which integrated optimisation for increase of impact, consistent with decrease of overall costs, can be achieved in the PDS and RPDS schemes. NIC has made a beginning in this direction with the development of methodologies for three important modelling efforts.

1. Multi-objective Decision Support System
2. Distributed Optimum Feedback Control system Model
3. Geographic Information System (GIS) for Transportation Planning

While the detailed mathematical description of these three models is beyond the scope of the present paper, a brief outline of the approach is given here.

4.1 **Multi Objective Decision Support System for PDS**

The Operations Research and Modelling Division of NIC[8] has developed the methodology for a multi-objective decision support system for PDS and RPDS. Taking note of the reserve stocks in the central pool, the Ministry of Food allocates Rice and Wheat to the various States just a week in advance of each month. After the allocations are made, the demand projected by the various States, the available information and intuitive decision making, the documents highlighting the quantum to be supplied to the recipient states are passed to FCI for implementation. The actual movement decisions of source to destination are made by FCI again on the basis of urgency projected by various States, available information and intuitive decision making. The present movement planning of FCI is on a monthly basis. Based on the directional flows estblished by the FCI, the information of the movement is conveyed to the source as well as to the recipient depot. This forms the basis for the indents for wagons to be made at the originating stations with the Railways. Food grains for despatch are brought to a rail head, which is either a Railway owned or FCI owned siding and loaded manually into the wagons and at its destination is unloaded again at railway owned or FCI owned siding.

FCI is expecting an exponential increase in procurement and arrival of stocks in the future. The present storage capacity with FCI and its agencies will not be sufficient to accommodate the entire procurement. Procuring states like Punjab, Haryana, Uttar Pradesh, Andhra Pradesh have only limited capacity to accommodate grains and the surplus have to be moved to consuming States for storing and distribution. This has added a new dimension to the grain movement in PDS and RPDS.

To ensure optimal utilisation of the space at the existing warehouses, careful planning of the grain movement is necessary. For this, a computer aided model has been proposed to decide locations for creating additional storage capacities and also to determine the optimal monthly movement planning. The model developed is a multi-objective decision support system (MDSS).

4.2. **Distributed Optimal Feedback Control System Model for PDS and RPD**

The author has developed an Optimum Control System Theoretic Model for a Distributed Frame-work which can accommodate a Distributed Geographic Information System over a Computer-Communication Network which is in consonance with the frame-work in which the PDS and RPDS functions (Seshagiri, 1992). The Control theoretic Method suggested enables the construction of models in terms of control objective functions and constraints as well as synthesis of control and realisation. The steps in the construction of the distributed system theoretic model of PDS and RPDS have been worked out with specific reference to the realisation of optimal distribution. GIS on NICNET takes input in the form of geo-reference data both in spacial and tabular forms. It provides efficient tools for inputting into the database, retrieval of selected data items for models and software modules for analysis. Both spacial (e.g. maps) and non-spacial (e.g. census data, field data) information can be integrated and spacially registered data layer can be analysed independently or in combination with a number of other layers. This enables to stitch together bundles of data and manipulate them for the management and planning of the PDS. The model is baded on general theories of control systems earlier developed by Seshagiri[9](1971), Rastrigin[10](1974) Saluk Vadze[11] (1975) and Seshagiri[12] (1992).

4.3. **Geographic Information System for PDS Transportation Planning**

The Geographic Information System (GIS) software 'GISNIC' developed at NIC, can integrate multiple layers or vectors of maps with planning models intrinsically. Transportation planning in PDS is concerned with issues which are highly dynamic and temporal[13]. While applying geo-computing to transportation problems, one goes beyond spacial analysis, topologically indexed database structures or graphic display of geographic data. A geographic based information services strategy [14] (GBISS) is found to be essential for regional planning under PDS.

5. CONCLUSION

The NICNET based online database supporting the Public Distribution System progressively being implemented throughout the country may give the Management Information System for Demand, Allocation and Offtake for PDS, RPDS, PDS Prices and details of Fair Price Shops. As support to the FCI, a Grain Management Information System concerning stocks/offtake monitoring is being developed and progressively implemented by NIC. The present Distributed Database developed by NIC for the Ministry of Food and Ministry of Civil Supplies and FCI require modifications in order to maximally benefit from the nation-wide network, NICNET. The next logical step in the evolution of the Food Security Information System is the implementation of the Distributed Database and Distributed Modelling over all the 500 District nodes of NICNET with local level optimisations reconciled with national level global optimisation on a dynamic basis. The exercises like this, when fully implemented, can not only save, annually, thousands of crores of rupees by way of continuous integrated optimisation, but also ensures, through network-based monitoring, that the benefit of the thousands of crores of rupees of subsidies pumped in by the Central Government maximally reaches the poorer and the needy sections of the population with least 'transmission loss'.

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