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Agricultural Economics, Marketing and Statistics

AGRICULTURAL ECONOMICS AND MARKETING

Total factor productivity in livestock sector of India

India's livestock sector has grown at an annual rate of 4.3% as against the annual growth of 2.7% in the crop sector during 1970-71 to 2003-04. It has provided a cushion to the agricultural growth and livelihood of poor farmers, for whom livestock are important source of income and employment. Robust growth in the livestock sector has been the result of interplay of several factors public investment in dairying, private investment in poultry, technological change in breeding, feeding and health, and market infrastructure. Facilitated by investment and expanding markets, technology played a critical role in boosting growth of livestock sector. The total factor productivity (TFP), grew at an annual rate of 2.3% during the period, and accounted for over half of the growth in livestock sector. The TFP-led growth in livestock sector would sustain agricultural growth, reduce rural poverty and alleviate pressure of number-led growth on natural resources, which are already facing quantitative and qualitative deterioration.

Growth crisis in Indian agriculture

The growth of Indian agriculture during the post-WTO period declined sharply in almost all sub-sectors and commodity groups. Agriculture and non-agriculture sectors are also on a disparate growth path. The main reasons for deceleration and stagnation in agricultural output after 1995-96 are–slowdown in growth of use of fertilizers, irrigation, and energy (electric power) in some cases, stagnation or even decline in other cases. Crop intensity and area under cultivation also showed either poor growth or decline. Diversification towards high-value crops slowed down and in some cases, farmers were found diversifying away from high-value crops towards low-value, less-risky and less-input demanding crops. Terms of trade for agriculture showed deterioration, and agricultural incomes were highly unstable in recent years. Low level of input-use and low-productivity in most of the states offer scope for revival of agricultural growth, but it would require simultaneous efforts on several fronts. These include: (a) stepping-up investments and putting in place suitable institutional mechanisms to exploit irrigation potential that exists in most of the states, (b) increasing power supply to agriculture sector, (c) promoting fertilizer-use by expanding distribution network and improving credit facilities for farmers, (d) establishing competitive seed markets and ensuring attractive prices for seed; (e) improvement in terms of trade for agriculture, and (f) evolving measures to mitigate risk in farming.

Diversification of agriculture towards high-value crops: Role of smallholders

Gradual diversification of agriculture towards high-value crops exhibits a pro-smallholder bias, with smallholders playing a proportionally larger role in the cultivation of vegetables versus fruits. The observed patterns are consistent with simple comparative advantage-based production choices. The comparatively high labour endowments of the small farmers, as reflected in their larger family sizes, induce them to diversify towards vegetables. Although fruit cultivation is also labour-intensive (as compared to cultivation of staples), it is highly capital-intensive, making it a less advantageous choice for smallholders who tend to have low capital endowments. Small or medium holders do not appear to allocate a greater share of land to fruits or vegetables. However, the share allocated to vegetables is significantly higher if the family size is bigger, while reverse is true in case of fruits.

Demand for foodgrains towards 2011 and 2020

Per caput production of foodgrains had increased from 183 kg during early 1970s to 207 kg by mid 1990s, even though country's population increased by more than 50%. However after mid 1990s, foodgrains production could not keep pace with the population growth. Per caput production of cereals declined by 17 kg and pulses by 3 kg during the past decade. This could create a serious threat to food security, as the country identifies its food security with foodgrains security. Direct, indirect and total demands for foodgrains in India towards 2011-12 and 2020-21 were estimated by taking into account population growth, composition of rural and urban population, growth in per caput income in rural and urban areas and changes in taste and preferences. Total demand for cereals would grow to 218.9 Mt by 2011-12 and would reach 261.5 Mt by 2020-21. Demand for pulses during this period would grow to 16.1 Mt and 19.1 Mt, respectively. Domestic demand for foodgrains is projected to reach 235.0 Mt by 2011-12 and 280.6 Mt by 2020-21. It is important to mention that these projections do not include export demand.

Economic losses from avian flu

The impact of 'bird flu' outbreak in Manipur state in July 2007 was analyzed. It caused a massive economic loss due to culling of nearly 3.4 lakh birds after the Government of India notified it.

Impact of avian flu

Poultry farmers: The producers lost about Rs 316 lakh, as against of Rs 99.13 lakh given to them as compensation. Inadequate compensation may have two consequences: (i) it would affect the livelihood and sustenance of poultry farmers and their families, particularly in Manipur, which is already experiencing internal disturbances on account of economic reasons, and (ii) it might lead to poor compliance in culling and disinfection operations and hence lack of eradication of disease outbreak, which will have more serious implications.

Consumers: The price of chicken dropped after the outbreak of avian flu. The overall financial impact on the poultry sector in Manipur was estimated to be of around Rs 2,455.17 lakh on account of avian flu outbreak, which amounted to 14% of total value of livestock outputs and 0.5% of State Gross Domestic Product.

Exploring market opportunities for fisheries sector in India

Survey work was attempted in major fish markets and a mini consumer survey in Chennai metro city to explore the possibilities for developing

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Economics and marketing of goat enterprise

The large and progressive farmers, businessman and industrialists have adopted the commercial goat farming, and their entry into this activity would help in realizing the potential of goat enterprise as they have better access to technical knowledge, resources and market. Goats were economically viable under intensive system of management on 46% of commercial goat farms. This fact that the commercial goat farming could be taken up under intensive system of management would encourage the aspirant commercial goat farmers not having access to grazing resources. Majority of the commercial goat farms are operating with positive net returns, 39% are earning good profit, and their annual net returns per goat ranged from Rs 968 to 2,069. Intensification and commercialisation of goat enterprise is also important because of shrinking resources for grazing. The marketing of goats suffers from involvement of middlemen garnering high margins, avoidable marketing costs, unnecessary transportation, and mortality of animals during transit. The poor farmers had to sale their goats per head, per pair or per group basis. With the awareness building by the institute, the goat farmers in the adopted villages could have better understanding on appropriate marketing strategy viz., the type of goats to be sold, place of sale, right time and age of sale and right method of sale of goats. A number of farmers started preparing castrated male goats for selling then during the festival season. The average price realization during Eid for a male of 1-2 years of age was about 70% higher than the price realized during normal sale in the villages

Initial linkages were created among the commercial goat farmers of different states resulting in creation of large demand of good quality breeding goats for breeding purpose. Consequently the farmers who earlier got market rate of Rs 55 to Rs 65/kg live body weight for their goats started getting Rs 110 to 150/kg live body weight. At the same time the traders were not paying premium price even for the purebred goats. The increased prices of breeding goats due to strengthened linkages created large opportunities and interest for private investment in commercial goat farming projects. And also encouraged the existing commercial goat farmers to produce good quality pure breed animals (germ plasm) of different goat breeds, which would be critically important for goat enterprise development in the country.

domestic fish markets in India and compilation of fish marketing policies of Tamil Nadu State government. Chennai wholesale markets source fish from across the country's major fish markets like Howrah and Calicut to fill the demand supply gap for particular fish varieties arising due to ban on fish capture from the seas of east coast. These markets also source their fish from fish farms of Andhra Pradesh (Indian Major carps, Shrimp), Tamil Nadu and Kerala. Chennai has presently five major wholesale cum retail fish markets and 150 medium and small size neighbourhood fish markets. The consumer survey indicated that the performance of these markets could be considerably improved if sanitation, parking facilities, proper weighing and icing facilities are introduced. Share of these markets is slowly being taken away by modern chain stores as these suit the busy schedule of consumers' lifestyle.

AGRICULTURAL STATISTICS AND COMPUTER APPLICATION

- A window based *software for survey data analysis* was developed for the selected sampling schemes. It includes methods for various sampling schemes such as simple random sampling (SRS), probability proportional to size (PPS), stratified, cluster, two stages and stratified two stage. It considers both types of cases i.e., when the units have been selected with or without replacement. This software also estimates the parameters in the situation when units are selected with unequal probability and

with replacement. Ratio method of estimation for the population mean was also included in the software for the simple random sampling and stratified random sampling. The results of the schemes are presented in the form of crystal reports available under Visual Studio, 2005 (IDE).

- The *estimates of area and production of important fruits and vegetables* are being obtained under the scheme on *Crop Estimation Survey on Fruits and Vegetables* (CES-F&V). To improve the methodology, a project entitled "Pilot study to develop an alternative methodology for estimation of area and production of horticultural crops" was undertaken. The study was conducted in Maharashtra and Himachal Pradesh covering important fruits and vegetables. This alternative methodology is cost effective, less time consuming and its survey procedure is more simple. It is easy to implement and provide estimates for more than one fruit/vegetable at district level. Market arrival data was used for obtaining state level estimates. There is a significant decrease in sample size i.e., from 150-200 villages per district (under CES-F&V) to either 80 or 43 villages per district depending upon the desired precision. This methodology is required to be tested in few more states before actually implementing it on a large scale.

- The institute initiated a study to examine the feasibility of the developed *sampling methodology* for estimation of crop yield at Gram Panchayat level for large scale adoption. The field work of the study was undertaken in one district per state of Uttar Pradesh, Karnataka, Andhra Pradesh, Punjab and Rajasthan. The farmer appraisal data about crop produce and crop cutting experiments data as obtained from general crop estimation survey (GCES) were analyzed using small area crop estimation methodology (SACEM) to develop estimates of crop yield at GP level. The GP level estimates were very precise.

- Under the project *weather based models for forecasting potato yield*, weather indices (W 1) based regression models were developed by taking combinations of linear and square indices with yield/detrended yield. Complex polynomial (CP) models, using GMDH technique, were developed.

- *Design resources server* (www.iasri.res.in/design) was developed to popularize and disseminate research in design of experiments among experimenters and research statisticians were strengthened by adding the following material/links:

The material available on the server has been partitioned into four main components:

– *Useful for experimenters*: Electronic books, online generation of randomized layout of designs, online analysis of data and analysis of data using various softwares.

– *Useful for research statisticians:* Literature and catalogues of BBB designs, designs for making test treatments-control treatment comparisons, supersaturated designs, online generation of Hadamard matrices, MOLS and orthogonal arrays.

– *Other useful links*: Discussion Board, Ask a Question, Who-is-where and important links.

– *Site information:* Feedback, how to quote design resources server, copyright, disclaimer, contact us and site map.

The design resources server www.isari.res.in/design is like a mobile library on design of experiments in particular and statistics in general. It provides useful information both for active researchers in statistics as well as stakeholders like scientists in NARS and others all over the globe. The server is dynamic in nature and new links on various topics are added to it regularly.

Developed a method of construction of designs for *incomplete multi-response experiments*. The designs were economical from resource point of view. Developed a step-wise procedure of analysis of incomplete multi-response designs.