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ABSTRACTS

WTO and Indian Agriculture: Implications and Strategies

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The study has encompassed some wide-range issues like impact of AoA (agreement on agriculture) on pattern of world farm trade, impact of WTO on India's farm trade, comparative advantage of India in various farm commodities, desired reforms in Indian agriculture to enhance its competitiveness, etc. The study has observed that India's share in world agricultural trade has increased, but this increase has largely come through a deluge in India's agricultural imports rather than through exports. The study has pointed out that India has a wide scope to increase its tariff rates for checking the cheap agricultural exports, as per provisions of AoA. It has also been revealed that agricultural exports of least developed countries have been insignificant and declining. Developing countries had expected to gain new export markets, but instead their imports of agricultural products have gone up. The SPS measures have emerged as a major constraint in enhancing agricultural exports by developing countries. Certain policy implications have also been suggested by the paper.

Changing Market Environment in Gujarat Agriculture for Sustainable Development

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The adoption of Model Agriculture Act in place of APMC Act by the Government of Gujarat in 2007 has changed the agricultural scenario in the state. The new act has opened entry of private companies into the agricultural sector and its effect can be seen in the entry of firms like 'Farm Fresh', Gujarat Agro Industries Corporation, 'Desai Fruits and Vegetables', 'Maccain Foods India Limited', 'Pepsi, etc. These companies have plans to open private wholesale markets and set up plants at different centres in the state. A Hyderabad-based Company has plans to set-up a 'food park' at Jamnagar. The paper has discussed in detail the success stories of two food commodities — potatoes and bananas — which are being cultivated under contract farming. The study has highlighted that against the all-India average potato production of 18 t/ha, Gujarat's average is 22 t/ha and of farms under contract farming with Maccain, it is 40 t/ha. Similarly, with the introduction of tissue culture the banana production has gone up from 40 t/ha under conventional technology to 90-110 t/ha. The contracting firm, Desai Fruits and Vegetables has become the India's largest banana exporters, with sales of US \$ 750,000 in 2006-07.

Economics of Liliium Production under Contract Farming in the Nilgiris District, Tamil Nadu

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The economics of liliium production under contract farming has been studied by randomly selecting 15 contract growers registered with Kotagiri Floritech Company (KFC) in the Nilgiris district. The bulb, the most important seeding material for cultivation of liliium, is imported from Holland and supplied to growers who normally grow two crops in a year. Among variable cost components, planting material (bulb) accounted for the highest (71%) share, followed by interest on working capital and labour charges. This indicates that liliium is a capital-intensive as well as labour-intensive crop, generating round-the-year employment for labourers. The rate of return on investment has been found as 2.99, i.e. aliliium grower gets Rs 2.99 as return by investing one rupee in the production process. Poor availability of institutional credit and difficulties in securing high quality planting and seeding materials are the major constraints facing cutflower production in the state.

Direction of Cashew Trade in India: A Markov-Chain Approach

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India is the largest producer, processor and exporter of cashew in the world. In the first three decades of independence, i.e., from 1947 to 1977, India accounted for 99 per cent of the world trade in cashew kernels. The development of cashew crop in Brazil and processing facilities in East Africa led to a competition in cashew kernel market and India's share has progressively reduced to 50 per cent of the global trade. In this study, the direction of export and import of cashew nuts has been reported during pre-liberalization (1980-81 to 1991-92) and post-liberalization (1992-93 to 2003-04) periods with the help of Markov-chain model. It has been found that USA and Netherlands are the major importers of Indian cashew, as has been indicated by high probability of retention during both pre- and post-liberalization periods. Countries like UK, Japan and Australia have depicted low values of probability of retention during the pre-liberalization period, indicating that they were the unstable importers of Indian cashew, whereas during post-liberalization period, UK and UAE have been found the unstable importers of Indian cashew. The results of imports of cashew have shown that Ivory Coast, Tanzania and Guinea Bissau have been the major exporters of raw cashew nuts to India, as has been reflected by the high probability of retention. On the contrary, Mozambique, Benin and Indonesia have recorded zero probability of retention during the post-liberalization period, which indicates that they are the most unstable exporters of raw cashew nuts to India.

Changing Scenario of Agri Markets in India — A Study

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The paper has dealt with the prevailing alternative marketing systems which are more need-based and are being evolved slowly from the traditional marketing systems so as to reduce the gap between producer and consumer. The paper has also highlighted the success factors of these alternative marketing systems and has identified their inbuilt constraints. The emerging agri-business opportunities discussed include organic farming, e-sourcing, establishment of processing plants and value-addition units, futures trading, agri-retailing, contract farming, spot national exchanges, etc. Policy issues under the changing market scenario have been discussed. Some of the major problems or issues that have emerged from the study are: resource constraints, poor market institutions and infrastructural support, lack of fair price discovery mechanism, poor grading and packaging facilities at farm level, fragmented supply chain of agricommodities, lack of efficiency in working of futures exchanges, prevalence of unscrupulous trading practices, etc. The study has also made some recommendations to bring efficiency in agri-markets of India.

An Empirical Analysis of Bullock Pricing: A Study in West Bengal

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The factors affecting the market price of bullocks transacted in the four animal markets of the Nadia and Hooghly districts of West Bengal have been analysed. It is reported that age, general appearance, temperament, breed and training are the most significant contributory factors to the price of bullocks. Age of animal has a non-linear relationship with price and it is revealed that a six-year old bullock commands the maximum price in the market. In terms of breed, it has been found that bullocks from Bihar and Haryana have a premium price over the local non-discript breed. It has been attributed to their better drought capacity over the local bullocks. The training of bullocks has also been found to fetch a higher price, since a trained bullock could be used for agricultural and transportation operations from the first day of purchasing, while an untrained bullock has to be trained. The study has suggested that farmers should upgrade their native indigenous bullocks by incorporating superior germplasm for draftability, develop grading system for price fixation and sell 6-year old animals to fetch better price in the market.

Growth, Instability and Acreage Response of Principal Crops in Tamil Nadu

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The performance of agricultural sector in Tamil Nadu, before and after liberalization, has been examined by analyzing the growth and instability in area, production and productivity of principal crops, and by estimating their acreage responsiveness to various price and non-price signals. The acreage under foodgrains has been observed to be declining steadily and is accompanied by low instability over the entire study period, 1980-2005. Commercial crops like maize, banana and sugarcane have shown positive growth in area during this period, with sugarcane becoming more unstable and banana becoming more stable during the post-liberalization period. While the performance of turmeric has improved, that of jowar and cotton has deteriorated after liberalization. The analysis has shown that yield performance of almost all the crops was better during pre-liberalization period, although their yield instability was high. During the post-liberalization period, though the fluctuations in yield have decreased, the growth in yield of commercial crops has become negative. The study has shown that lagged price and lagged area have a positive influence on the acreage under a crop. The impact of decrease in area under foodgrains could be minimized by increasing productivity through narrowing yield gap, use of efficient extension methods, efficient use of inputs, and providing access to credit. The high degree of instability prevailing in commercial crops demands efficient crop insurance delivery mechanism. The policymakers can use price mechanism as a tool to bring more area under commercial crops to enhance income and employment of the rural people.

Institutional Mechanism in Poultry Contract Farming – A Case Study in Pune District

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The institutional mechanism in poultry contract farming has been studied by analyzing the nature and services rendered by the contracting firm, relative economics of contract and non-contract farmers and problems of contract farmers and sponsors. The study is based on data collected by survey method for the year 2006-07 and involving Venkateshwara Hatcheries Group Ltd (VGHL) as a contractual sponsor. It has been found that the net income per bird is almost double in the case of contract farmers. The resultant output-input ratio over total cost has worked out to be 1.14 in the case of contract farmers and 1.07 in non-contract farmers. Declaration of fair prices to season, prompt payment, spot-purchasing, efficient technical assistance, better coordination of field activities and sufficient and timely credit supply by sponsors are the key issues in making contract farming successful. According to the study, issues like less mortality, better hygienic conditions, adequate training facilities and effective medication to overcome hyper-disease-sensitive broiler farming alongwith sufficient and timely supply of quality inputs and credit, backed by suitable policy and inter-institutional linkage support, promise better future for contract broiler-farming. The problems faced by sponsors have been identified and can be overcome with a closer supervision.

Supply Chain and Logistics Management in Fruits and Vegetables Retailing

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India is the second largest producer of fruits and vegetables in the world, contributing about 10 per cent to the total world production. But, there are high wastages of fruits and vegetables, to the tune of 35-40 per cent of their production. The reasons attributed for this status are lack of efficient supply chain and logistic management practices such as involvement of more number of intermediaries, lack of cold storage and transportation facilities, negligent attitude towards the post-harvest losses, etc. Some of the suggestions emanated from this study are: reduction in the number of intermediaries in the supply chain, better demand forecasting and planning by the firm, applying proper logistics such as cold chain infrastructure and automatic handling equipments, entering into forward and backward linkages such as contract farming, and developing and strengthening of the information system. The study has also suggested adoption of advanced grading, sorting and packaging techniques by both export-oriented and domestic firms.

Institutional Innovations in Agricultural Supply Chain — A Case Study of Potato

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The linkages and innovations in supply chain of potato have been studied and their impact on potato growers has been reported. It has analyzed two institutional innovations in potato supply chain — Pepsico model (Punjab) and Merino model (Uttar Pradsh). The study has found that potato production under contract is more remunerative with positive spill-over effects. However, full potential of such innovations could be harnessed only by ensuring effective co-ordination, speedy communication and mutually beneficial collaboration among different stakeholders in potato supply chain. The paper has argued that close collaboration between public and private sectors for potato R&D will be the key to incorporate market signals (consumer demand for food quality and safety) in early R&D process. However, due caution is needed to address the IPR issues while initiating public-private R&D collaborations. Finally, institutional innovations which aim at providing access to technology (seed), credit, technical know-how, infrastructural facilities and perfect information flow among various stakeholders would be crucial for development of efficient agricultural supply chain and integrated agri-food markets, benefitting all the stakeholders in agricultural supply chain.

Emergence of Organized Food Retailing : Consumers' Behaviour and Perception in Uttarakhand

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The study conducted in Uttarakhand, has evaluated the consumers' perception about organized retailing. The potential of organized food retailing in the state has also been evaluated and some strategic interventions have been suggested. The study has been conducted in prime industrial locations of the state, viz. Haldwani, Rudrapur and Dehradun. The respondents were divided into three strata, viz. lower income group (LIG), middle income group (MIG) and higher income group (HIG). Amongst these three income groups, HIG has depicted maximum share (9.9%) of farming in its total income, followed by MIG (2.9%) and LIG (2.7%). Similarly, MIG has shown maximum dependence on services for its livelihood (97.1%), followed by LIG (96.1%) and HIG (89.6%). Expenditure analysis has shown that the consumers in LIG spend 69.0 per cent of their total monthly expenditure on food items, while it is 48.2 per cent for MIG and 29.8 per cent for HIG. The consumers belonging to HIG prefer quality and rate is the most important factor while purchasing food commodities. Consumers in MIG group have also been found to be quality conscious, coupled with price-consciousness while purchasing food commodities. Price is the most important attribute for consumers under LIG. Relationship marketing, variety, limited quantity purchases, reasonable price, credit facility, personal attention, and nearness are the major key factors which have been found responsible for the success of unorganized food retail markets.

Marketing Costs, Returns and Problems in Marketing of Broilers in Maharashtra

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The study conducted around Pune city in Maharashtra has revealed that the main marketing intermediaries through which the broilers pass from producer to consumers are : (i) Producer, (ii) Wholesaler, and (iii) Retailer. The producer sells 95 per cent broilers through wholesaler and remaining 5 per cent through retailer. The two major marketing channels followed in marketing of broilers are as follows: Channel I: Producer → Wholesaler → Retailer → Consumer, and Channel II: Producer → Retailer → Consumer. The producers share in consumer's rupee has been worked out to be about 83 per cent and 88 per cent through channel I and channel II, respectively. The margin of the wholesaler and retailer has been found 4 per cent and 6 per cent, respectively in channel I and of retailer as 7.6 per cent in channel II. The major problems in marketing of broilers have been identified as low price of the product, non-availability of quality feed and skilled labourers, and lack of finance.

A Comparative Analysis of Organized and Unorganized Milk Marketing System and its Constraints in Samastipur District of Bihar

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This study has assessed the milk marketing system through a comparison of marketing costs, marketing margins, price spread, producer's share in consumer's rupee, and marketing efficiency of dairy farmers in organized and unorganized milk markets in the Samastipur district of Bihar state. The study has revealed that marketing cost of milk (per litre) was higher in organized than unorganized milk market due to the involvement of more marketing processes. The marketing efficiency has been found higher in unorganized (3.68) than organized (1.96) milk market, mainly due to multiplicity of marketing charges. The socio-economic variables that affect the farmers' decision regarding choice of organized or unorganized marketing system have been reported and constraints being faced by dairy farmers have been identified. Reduction in commission charges, provision of cheap and efficient transport facilities and strengthening of organized milk marketing system are the major suggestions of the present investigation. The study has observed that regular payment, training, sound infrastructure, timely availability of information about milk price, involvement of dairy farmers in decision-making process and providing regular veterinary services to their milch animals are the major factors that will contribute substantially to the performance of milk marketing system in future.

The Supermarket Revolution in Indian Agriculture: Strategic Issues and Policies of Competitiveness

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The paper has highlighted the paradigm shift occurring in the retail sector of the Indian economy. The Indian retail industry which was of US \$ 300 billion in 2006, is likely to reach US \$ 427 billion by 2010. Outlining the entry of corporate sector into retail marketing in India, it has discussed the evolution of cooperative movement in the farm sector. But to make the new market-orientation friendly to small and marginal farmers is a big challenge to the agricultural research system. It has suggested that these farmers should be assisted in improving their productivity and profitability through timely input supply and educating about quality management. The paper has also discussed the existence of a plethora of laws/regulations at the central, state and local/municipal levels in retailing in India. It has pointed out the lack of specific legislation and nodal agency controlling retail marketing in India. Issues like establishment of special agricultural zones (SAZs) and foreign direct investments (FDIs) in retailing have also been discussed.

Assessment and Factors Affecting Growth of Horticultural Sector in North-East Region of India

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This paper has analyzed the performance of horticultural sector (including fruits, vegetables and spices) across the north-eastern states and has studied the pattern of plan investment as well as output growth of horticultural commodities. An analysis of various factors influencing development of horticultural sector in the region has also been presented. It has been concluded that the investment in horticultural sector in the north-eastern states has started paying dividends, but at a slower rate in comparison with its underlying potential. The development of fruit sector has been observed encouraging but same is not true for the growth in vegetable production. The growth in spices production has been at a slow rate or has remained almost unchanged across different states of the region. Mass production and distribution of quality planting material for fruits and spices can be accorded top priority. Among several measures suggested for horticultural development in the area include capacity building of the farmers, expansion of area under off-season vegetable crops, application of nutrient and water management, establishment of farmers association, contract farming (particularly for organic production), and production through self-help groups (SHGs). The establishment of market intelligence unit has been considered utmost important to provide advisory services about price movement and market arrival of various horticultural commodities in the area.

Potential Production and Profitability of Fish in Central Madhya Pradesh

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The cost and returns and resource-use efficiency have been reported along with the constraints in fish production based on primary data collected from the Panager block of Jabalpur district in Madhya Pradesh. The yield levels have been found to vary from 1291 kg/ha to 1874 kg/ha with an average of 1671 kg/ha, which is quite satisfactory under the low level of technology. The gross return has been calculated as Rs 60498/ha with net return of Rs 40998/ha. The output-input ratio has been found as 2.82, which is maximum in large (2.98) and minimum in small (2.74) ponds. The coefficients of fertilizer, feed, seed and protection cost have been found to have positive impact on the output of fish in the study area. The constraints identified in the study include non-availability of improved fish seed, lack of capital and market infrastructure, lack of technical know-how, theft and fear of enemies, water pollution, and attack of fish parasites and diseases. Appropriate addressal of these bottlenecks through policy intervention will step up and streamline fish production in the state.

An Assessment of Investment Priorities of Public-owned Properties in Tamil Nadu

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A comparative study has been made on the pattern of capital investments by tenants of temple-owned lands and owner-operated lands in the districts of Thanjavur and Tirunelveli in Tamil Nadu, based on the data pertaining to the year 2002-03. The study has revealed that livestock has been the first choice for investment by both temple-tenants (91.4%) and owner-farmers (87.0%). The land has been found as the next preference for investment by owner-farmers (6.4%), while for temple-tenants, it is at the third preference (2.3%) after sprayer (4.7%). Investment on field channel has been recorded as the last preference with both types of farmers. The main reason identified for high investment on livestock is supplementation of farm income by it, particularly in the case of temple-tenants. The study on determinants of investments has revealed that farm-size does not affect the level of investment by temple-tenants, while it ranked first with largest elasticity for investment by owner-farmers. Problems being faced by temple-tenants and owner-farmers have also been identified.

Trends in Agricultural Input Subsidies, Consumption, Production and Income

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The study has assessed the extent of agricultural input subsidies, estimated the trends in subsidies, fertilizer-consumption, agricultural production and income and has found the correlation between subsidies and agricultural production. Percentage analysis, linear trend, compound growth rate and correlation analysis have been used to analyze the data collected from secondary sources for the period 1993-94 to 2004-05. The total input subsidy has been found to increase from Rs 14069 crore in 1993-94 to Rs 36514 crore in 2002-03. Nearly one-third of the subsidies was given to fertilizers. The price of fertilizer has been recorded to increase from Rs 6.00/kg of N in 1992 to Rs 10.50/kg of N in 2005-06. The consumption of fertilizer had increased from 68 kg/ha in 1990-91 to 107 kg/ha in 2005-06. There has been an increasing trend in fertilizer consumption due to the support given by the government. A positive and significant correlation has been found between fertilizer-use and agricultural gross domestic product. The percentage of total agricultural subsidies to agricultural GDP has been found to be less than 10 per cent. Considering the rising demand for food grains, it is necessary to increase both productivity and production of food grains. The study has revealed that developing countries like India have to provide support to farmers to increase agricultural production.

Agricultural Input Subsidies Utilization in Maharashtra: Quantum of Subsidies to SC/ST Farmers

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The utilization of direct and indirect subsidies by the SC/ST farmers in irrigated and less-irrigated districts of Maharashtra has been estimated. It has been observed that utilization of direct subsidies is relatively higher in irrigated than less-irrigated districts among both SC/ST and non-SC/ST groups of farmers. The average direct subsidy used by SC/ST farmers is higher than non-SC/ST farmers. The total indirect subsidies used by the farmers belonging to SC/ST and non-SC/ST groups are substantially higher in irrigated than less-irrigated districts. The total subsidies (direct plus indirect) utilized by the farmers of irrigated districts is about 87 per cent higher than the subsidies utilized by the farmers of less irrigated districts. This is also true with SC/ST and non-SC/ST group of farmers. The major problems identified in accessing input subsidies are : lack of information about direct subsidies, non-dissemination of information by Gram Sevaks/Village Development Officers among weaker sections, limited availability of direct subsidies; non-availability of pesticides and fertilizers in time; difficulties in getting subsidies from the concerned authorities and poor accessibility to institutional credits. Non-awareness about various subsidy schemes introduced from time to time to help the weaker sections of the farming community is also a constraint. Crops such as pulses, oilseeds and cotton suffer from low productivity, mainly because of low use of inputs in Maharashtra. Therefore, direct subsidy schemes focusing on these crops need to be introduced with higher allocation of money.

Government Expenditure, Growth and its Effect on Promoting Livestock GDP and Reduction of Rural Poverty in India

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The study has analyzed the status, growth rates and trends in government spending on animal husbandry and dairying, livestock GDP, investments in agriculture, AgGDP and national GDP. The effect of government spending on livestock for promoting livestock GDP and alleviating poverty has been studied. The study has shown that milk group contributed a major share to livestock GDP during the period 1970-2004. The growth rate in livestock GDP has been found steady at about 4 per cent, but agricultural GDP has been noticed fluctuating. The government expenditure on animal husbandry and dairying (GEAHD) had increased one-and-half-fold in real terms during 1980s than 1970s. But, the same trend was not followed during the rest of the decades. From 1990s onwards, it has been found declining, which is a serious concern and needs policy attention. Its overall annual compound growth rate during 1980s and 1990s and during WTO regime has been recorded negative, but the value of output growth rates during this period varied from 4 to 5 per cent, which is paradoxical. It shows that no proper economic rationale was used in allocation of funds to the livestock sector. The growth trend in livestock GDP has been found steady and increasing, but livestock investment has been found fluctuating. The study has inferred that to increase livestock GDP and reduce poverty, the government expenditure in livestock sector should be increased.

Investment on Horticultural Research and Development: Evidence from Konkan Region of Maharashtra

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The growth in investment on horticultural research and development has been studied on major horticultural crops in the Konkan region of Maharashtra. The compound growth rates have been computed based on time series data on area, production, productivity of mango, cashew, and coconut crops and investment on horticultural R&D during 20-year period, viz. 1981-82 to 2000-2001 using the General Price Index with 1993-94 as the base year. The multiple linear function form has been used for economic analysis. Among the selected crops, growth in investment has been recorded highest in mango, followed by cashew, both in nominal and real terms. The area under mango, cashew and coconut has grown at the rate of 15.22 per cent, 6.51 per cent and 2.05 per cent per annum, respectively. The growth rates of production and productivity of major horticultural crops have indicated that the impact of R&D was positive in the Konkan region. The regression coefficient of research expenditure has implied that an increase of one rupee in horticultural research expenditure results in Rs 261.60 in horticultural returns and increase of one rupee in the development expenditure results in the return of Rs 15.22 from horticultural production. The IRR for investment on horticultural research has been found much greater (119.12% per annum) than the interest rate of 12-13 per cent per annum prevailing during the period. This has shown that investment on horticultural research and development is highly profitable.

Improving Delivery Mechanism of Grassroot Level Institutions in Agricultural and Watershed Development Programmes

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A number of studies have demonstrated that the effectiveness of programmes for conservation of soil and water resources implemented by the state departments is low across states and they encounter the problem of poor delivery. In an effort to ameliorate the situation a participatory approach, involving users and other stake-holders, has been made mandatory in all the watershed development programmes. But, the experience of watershed development programmes points towards the need of some effective grassroot level institutions for their successful implementation. Under this scenario, a novel framework for a grassroot level institution, viz. 'Gram Panchayat' has been suggested. This new approach encompasses nomination of some self-help group members and a few technically competent persons to 'Gram Panchayats'. The new framework will be able to provide technological guidance to the farmers for their socio-economic development. Autonomous and powerful Gram Panchayat with little hierarchical constraints will be the ultimate institutional set up capable of meeting their constitutional obligations in letter and spirit. However, in view of the physiographic and ethnic diversity in the country, institutional innovation at the community level has to be a continuous process and must be experimented with to evolve a functional and more effective Gram Panchayat.

Assessment of Veterinary Health Services for Small Livestock Farmers of Bareilly District in Uttar Pradesh

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This study has basically assessed the status of government-run veterinary services by collecting data on budgetary allocations, infrastructural facilities and manpower against livestock population through secondary sources of Animal Husbandry Department. Data related to the livestock-owners' response towards the government-run veterinary services have been collected from a total of 180 livestock owners in six villages of Bareilly district with the help of a semi-structured interview schedule. The study has revealed that there is inadequate financing by the government for the provision of veterinary services. A major portion of the budgetary allocations is spent on administration rather than veterinary services and animal healthcare. It has also observed that the available manpower and infrastructural facilities in the study area are not sufficient to meet the needs of the existing livestock population. The study has indicated that a majority of the livestock-owners in the study area are not satisfied with the government veterinary services. The study has suggested implementation of cost-recovery measures for provision of veterinary services and utilization of para veterinarians at the village level to improve these services.

Crucial Input Supply Status in Maharashtra

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Based on the data from various published sources, the study has revealed that the net cropped area has declined from 178.8 lakh hectares to 174.32 lakh hectares over a period of 44 years, from 1960-61 to 2003-04, but the gross cropped area has increased by 17.90 per cent during this period. The distribution of HYV seeds of major crops grown in the state is poor, which has affected their productivity and production. The per hectare consumption of chemical fertilizer has declined to 87 kg in 2005-06 from 90 kg in 1999-2000. The consumption of pesticides has also declined to 3030 tonnes in 2005 from 6450 tonnes in 1993. The farmers are getting aware about improved/new farm implements and machineries, but they do not have easy access to them. The small farmers still use traditional tools. The agricultural commodity markets are few. Thus, the status of input-supply chain in Maharashtra is poor and there is an urgent need to strengthen this system.

Performance of National Seeds Corporation as Seed Distribution Agency: A Case Study in Gujarat State

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The performance of National Seeds Corporation (NSC) has been studied as a seed distribution agency and quality parameters of its products and services have been evaluated by randomly selecting 40 farmers and 16 dealers in the Gujarat state. The study has revealed that only 29 per cent farmers are satisfied with the quality of NSC seeds, while 63 per cent have expressed their rating as 'average'. Only 18 per cent farmers have opined that the germination in NSC seeds is better than the seeds of other agencies. A majority of the respondents (71%) have not lodged any quality complaint against NSC seeds. They have expressed that price of NSC seeds is very reasonable but the extension services of NSC are not satisfactory. About 68 per cent respondents have expressed satisfaction with the accuracy of weights, whereas 26 per cent farmers suggested new weight packing. About 63 per cent consumers of NSC seed have opined that NSC should concentrate on more intensive extension services.

Changing Marketing Scenario of Agri-inputs, Outputs and Consumer Goods in Haryana

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Based on the primary data collected from eight villages in the Hisar and Karnal districts of Haryana, the study has reported that about three-fourths of the total per farm expenditure goes to agri-inputs (seed, fertilizers and pesticides, etc) and one-fourth to consumer goods and consumer durable goods. About one-third (38% in Hisar and 33% in Karnal districts) of the total farm purchases of agri-inputs and consumer goods and one-third (33% in Hisar and 38% in Karnal districts) of consumer durables are made within the villages and the rest are purchased from the nearby towns by incurring an additional cost of about Rs 400 per farm. Farmers have been found to sell about 49 per cent of their produce in urban market in Hisar and 100 per cent in Karnal districts and incur marketing cost of Rs 1092 and Rs 1995 per farm in these districts, respectively. The study has identified poor market infrastructure and inadequate supply of quality goods as the major constraints and has drawn attention towards the need of development of rural markets in these areas.

Role of Agricultural Inputs and Infrastructure on Agricultural Development in Chhattisgarh State

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The impact of infrastructural facilities on agricultural development has been studied in the state of Chhattisgarh, based on secondary data collected for the years 2000-01 and 2004-05 from the Office of Directorate of Economics and Statistics, Raipur. The study has revealed that rice is the major crop occupying the largest (67%) cropped area. It is followed by lathyrus, minor millet and pigeon pea. The productivity levels of rice, maize, gram and tur have increased due to enhanced use of inputs like fertilizers, HYVs and irrigated area over the years. The distribution of certified/quality seed has depicted a significant increase in 2004-05 over 2000-01 value, particularly in rice, soyabean and wheat crops. The basic infrastructural network in terms of transport, communication, drinking water, healthcare, education, electricity, market, credit institutions, etc. has been poor in the state, but has started showing improvement in recent years. A market network has been designed for the state to cover collection centres in the rural areas. The study has highlighted the need to develop small-scale agro-processing and cottage industries in rural areas of the state for generating employment and income for the farmers.

Integrated Pest Management Technologies — Adoption and Constraints

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The adoption of different IPM practices has been examined in three crops, viz. cotton, groundnut and pigeonpea in three districts of Andhra Pradesh. It has been observed that farmers follow a wide range of practices of manage the pests. However, the adoption of different components of IPM has been found to vary across crops. On the whole, the cultural components of IPM such as summer ploughing and intercropping are adopted to a large extent by the farmers. The adoption of biological components such as nuclear polyhedrosis virus (NPV) and *Bacillus thuringiensis* (Bt) has been observed to be limited due to constraints in their availability as well as lack of proper understanding on the application methods and their efficacy. Another important constraint to IPM adoption is the mindset of farmers. The study has suggested that awareness should be generated among farmers about IPM technologies and availability of quality inputs should increased for their adoption on a large scale.

Stumbling Agriculture in Economically Fragile Region of India: Linkages with Institutional Mechanism and Public Investment

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The status, trend of utilization and expansion of various critical agricultural inputs have been examined in three poorest Indian states, viz. Bihar, Madhya Pradesh and Orissa. The production function analysis has also been reported for the period 1990-2003. The study has revealed that area under foodgrains in these three states has either stagnated or declined after 1990s. Although total food grain production has increased in these states, the growth in yield and area has decelerated. The study has also reported growth trends in input-use, access to institutional credit and capital stock in agriculture in the selected states. The impact of critical inputs on agricultural production has also been reported using double-log form of the equation. The study has suggested that besides increasing public investment in these regions, it is important to provide reliable source of irrigation and agricultural credit so that small and marginal farmers could reap the benefits of modern technologies.

A Study on Demand-Supply Balance and Marketing of Turmeric in Bihar : Need for Improving Marketing Efficiency in Changing Market Environment

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The demand-supply balance and availability of surplus turmeric for domestic marketing and export have been studied in the state of Bihar. The price spread of turmeric marketing and marketing efficiency have also been reported along with the suggestions for improvement under the changed market environment of the country. The demand-supply analysis has indicated that the surplus of turmeric is likely to be to the tune of nearly 13 thousand tonnes by the end of year 2010 and nearly 23 thousand tonnes by 2015. The price-spread analysis has indicated that the producer's share in consumer's rupee varies from 54 per cent to 60 per cent, the cost of marketing from 10.5 per cent to 11.5 per cent and marketing margin of intermediaries from 29 per cent to 34 per cent in the three identified marketing channels of turmeric in Bihar. The marketing efficiency index has indicated that the sale of turmeric directly through wholesalers is more profitable and efficient than through village traders. The study has emphasized on the need for improving marketing efficiency by reducing profit margin of intermediaries on one hand and encouraging the turmeric growers for group and co-operative marketing and selling the produce directly through wholesalers on the other hand for getting higher return for their produce.

Contribution of Credit Institutions in Development of Rural Economy in District Kanpur Dehat, Uttar Pradesh

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The study, carried out during 2004-05, has reported the contribution of credit institutions by selecting block Maitha in the district Kanpur Dehat of Uttar Pradesh. The district has 87 different bank branches, comprising 12 branches of District Central Cooperative Bank, 4 of UP State Rural Development Bank, 44 of Kanpur Kshetriya Gramin Bank and 27 of commercial banks. The Land Development Banks have been found forerunners in credit disbursement for modern farm technology as well as dairy and fishery, while commercial banks ranked first in credit advance to agricultural implements and piggery enterprises. The Regional Rural Banks have paid more attention to poultry, sheepery and goatary enterprises. The credit advanced by different credit institutions has played a vital role in the development of rural economy. The study has revealed that the average gross income, net income, family labour income and farm business income have increased after borrowing credit. On an average, farms have achieved a net increase of Rs 515/ha/farm from crops and dairy enterprise under post-borrowing situation, reflecting 82 per cent higher monetary gain over pre-borrowing situation.

National Agricultural Insurance Scheme – The Means of Livelihood Security for Cotton Growers in Madhya Pradesh

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The impact of National Agricultural Insurance Scheme (NAIS) has been evaluated on level of technology adoption and stabilization of farm income along with identification of constraints being faced by farmers and the implementing agency. The study conducted in the Khargone district of Madhya Pradesh has used technological adoption index and B-A approach to analyse the collected data. The study has revealed that NAIS provides good opportunists to farmers for dealing with the risk in agriculture. There seems to be an increasing acceptance of the scheme due to consecutive failure of monsoon. With the development of cotton technology, farmers have opted this crop to augment their income and employment. Consequently, more than half of the gross cultivated area has been put under cotton on sample farms. The yield of cotton (1904 kg / ha) has been found more than two-folds of the thresholds yield (832 kg / ha). Thus, no compensation claim was given to the insured farmers by the NAIS implementing agency. Higher premium rate and delay in settlement of claims and lack of technically trained staff have been identified as the major problems.

Input-use Gap and Technology Adoption among Female-headed and Male-headed Households in Bilaspur District of Himachal Pradesh

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The study conducted in the Bilaspur district of Himachal Pradesh, has reported gaps in input-use and agricultural productivity of female-headed households (FHHs) and male-headed households (MHHs) and adoption pattern of new agricultural technology among both types of households. Maize and paddy are the major crops grown during *kharif* season and wheat is the only crop grown during *rabi* season. The productivity of all major crops has been found higher in MHHs than FHHs. The expenditure on seed in all the crops has been recorded higher in MHHs, except maize, whereas in the case of fertilizer, a reverse trend has been observed. In general, the standard error has been found higher in MHHs than FHHs. The per hectare use of seed has been recorded higher than recommended in the case of maize and paddy in both types of households, whereas in wheat, the seed rate is close to the recommended level. The gap in seed has been found maximum in paddy, followed by maize and wheat. The use of fertilizer has been found higher in FHHs than MHHs. The low production in FHHs has mainly been due to delayed operations and inability to visit the agency being a female. Low purchasing power of FHHs has been found another important reason for adoption of technology by these households. The study has suggested the need of training and awareness generation among farmers, particularly FHHs.

A Study on Yield Performance of Various Technologies on Farms under Different Agro-climatic Sub-zones of Jharkhand

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The study on yield performance of various technologies has revealed high yield gaps between high-yielding varieties and local checks. These were 58 per cent with 'Birsa Niger', 45 per cent with 'Shivani' (oilseed), 52 per cent with 'Subhra' (linseed), 52 per cent with black gram and 31 per cent with 'Birsa Arhar'. The variability in highest and lowest yields of improved practices has been observed to be quite high in all the varieties. The agro-climatic sub-zones-wise analysis has revealed a significant variation in yields under the two situations and between highest and lowest yields among improved practices. The study has indicated ample potential in increasing production and productivity of these crops in the Jharkhand state and has suggested to evolve such technology that would sustain under different agro-climatic situations.

Pattern of Adoption of Farm Technologies under Changing Market Environments: A Case of Selected Dairy Technologies in Tarai Area of Uttarakhand

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The study carried out on 80 farmers in five randomly selected villages in Rudrapur Block of US Nagar district of Uttarakhand, has revealed that adoption rates have been high for artificial insemination (AI) and vaccination over the years compared to those of deworming and cross-breeding. However, during the past few years disadoption rates have been more for AI than other technologies. Findings regarding reasons for disadoption/non-adoption of technologies have envisaged the following policy implications: To ensure sustained adoption of resource-intensive technologies like AI and cross-breeding, government should focus on making timely availability of these technologies with adequate extension and support services. To ensure farmers' adoption of technologies like vaccination and deworming, it is necessary to generate awareness about the benefits of these technologies, making sure that these technologies are available frequently and timely by strengthening of the extension services. Findings regarding factors influencing early adoption of technologies have revealed that more than human endowments, institutional endowments, viz. access to credit and information, membership of a group, access to market, etc. affect favourably the adoption of dairy technologies.

Slow Growth Pulses Economy of India: An Analysis of Issues, Potentials, Production Sustainability and Policies

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Recognising the importance of pulses crops for their perceived ability to contribute significantly to food and nutritional security, economic growth and poverty reduction, this paper has analysed the issues in pulses economy of India. The paper is based on the secondary data collected from various published sources. The temporal and spatial analyses of pulses crops have revealed that there are significant variations across periods and regions in terms of growth in area, production and yield of pulses crops. It has also been found that there are variations in profitability of pulses crops. The results of Tornquist-Theil index of total factor productivity (TFP) analysed in terms of growth rates and trends in TFP have shown a continuous decline even after the 1990s. The rate of increase in input indices has been much higher than the output indices in all the major pulses-growing states. Technology being a major contributing factor to TFP growth, greater R&D emphasis on pulses crops is needed. Other factor which could make a set back on the present unsustainable behaviour of TFP is the price parity of pulses with competing food crops, market support and irrigation. A significant variation has been observed in yield, cost of cultivation and profit of major pulses crops. The study has suggested that the policy focus may be tilted towards development of pulses crops by way of developing irrigation infrastructure, access to institutional credits, supply of inputs, adoption of technologies, particularly use of HYV seeds, development of market infrastructure and adequate price supports. This would help in a big way to improve both production and productivity of pulses crops in the country.

A Study on Economics of Integrated Pest Management Technology for Cotton in Maharashtra

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The socio-economic characteristics, extent of adoption of IPM technology and economics of cotton production have been reported in the Amravati district of Maharashtra, along with the constraints being faced by the farmers in adoption of IPM technology. The study on the extent of adoption of IPM technology by different farm-groups has revealed maximum adoption by medium farms (>2-4 ha), followed by large (>4 ha) and small (up to 2 ha) farms. On the basis of data on cotton production, gross returns and net returns, the study has reported that per hectare output of cotton and consequently, the gross and net returns increase with the level of adoption of IPM technology. The input-output ratio has been observed more than unity in all the farm-sizes. It has been concluded that cotton production is a profitable proposition in the study area. The overall average adoption index of IPM technology has been found as 57.4 per cent, which shows sufficient potential in increasing returns and productivity of cotton cultivation in the area. The constraints being faced by cotton growers in adoption of IPM technology have been identified as lack of irrigation facilities, high cost of seed and fertilizer and lack of capital. The study has advocated the dissemination of IPM technology on a large scale for cotton production.

Economic Performance of Different Technologies of Rice Establishment: A Case Study of Bihar

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The comparative economics of rice cultivation by different methods has been studied. It has been found that each of the three direct seeding rice technologies have lower cost of cultivation as compared to transplanted rice. The total cost of cultivation per hectare has been found highest in transplanted rice (T.P.) (Rs 22,267), followed by wet seeding (WS) by rice seed drum (Rs 18,133), drill seedling (DS) by zero till drill machine (Rs 17087) and zero till (ZT) drilling by zero till drill machine (Rs 16,518). The reduction in cost has been due to savings in transplanting, uprooting and less irrigation requirements in direct seeding methods. The per hectare net returns have been calculated maximum in DS (Rs 20,745), followed by ZT (Rs 18237), WS (Rs 17,737) and TP (Rs 14613). Increase in net profit in direct seeded rice over transplanted rice has been observed to be highest in DS (42%), followed by ZT (25%) and WS (21%). The study has inferred that direct seeding of rice establishment is not only a low cost technology but is also highly profitable compared to traditional technology of rice sowing. It has recommended that direct seeded rice in general and that of DS in particular, should be adopted by the farmers on a large-scale to increase their income.

Impact of Crop Production Technology on Performance of Wheat in Western Maharashtra

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The present study has been undertaken, continuously for three years (2005-06 to 2007-08) in 16 tehsils of 10 districts of Western Maharashtra with the objectives of assessing the extent of adoption of improved technology for wheat crops, ascertaining the constraints in adoption of improved wheat production technology, studying the effects of improved wheat production technology on resource-use, costs and returns and finding the resource-use productivity of major inputs of wheat crops. The technology adoption index, working capital, human labour, machine hours, N and P fertilizer nutrients have together explained 85 per cent yield variations in wheat for above 51 per cent technology adoption, whereas 80 per cent variation has been shown by these variables in the case of up to 50 per cent technology adoption. The study has observed ample scope for expanding yield through appropriate management of inputs and technology for wheat production. The major constraints identified for non-adoption of recommended technologies are high cost of inputs, non-availability of FYM and recommended seed varieties, bio-fertilizers/ bio-inputs, lack of finance and irregular supply of electricity for irrigation. The saving of Rs 56/quintal in cost has shown that adoption of improved crop production technology has helped in improving productivity levels as well as the returns. The adoption of recommended technology along with use of balanced fertilizers with manure will help attain higher productivity of wheat.

Farmer's Adoption Behaviour of Emerging Rice Production Technology in Tamil Nadu

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The economics and farmers' adoption behaviour towards the system of rice intensification (SRI) have been studied in the Cuddalore district of Tamil Nadu, based on the data collected for the agricultural year 2005-06. The adopters of SRI have been found to realize increased productivity and thereby higher returns in paddy crops. The logic framework has indicated that age, farm-size, income of farm household, number of earning members and number of contacts with extension agencies have positive and highly influencing impact on the adoption behaviour of farmers. The farmers have been found vastly benefited by SRI technology. The adoption of this technique has helped to increase rice production without increasing the area under cultivation and has proved to serve as an alternative method for rice cultivation. The saving of water in rice cultivation is also a significant advantage of SRI technique.

Technology Adoption and Farmers Perception about Major Constraints in Punjab with Special References to Marginal and Small Farmers

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The study conducted in the state of Punjab has estimated yield gaps for major crops among different regions and for different farm-sizes, has worked out the index of realized potential yield (IRPY), has analysed the factors affecting crop productivity and has studied farmers' perception about production and marketing constraints. It is based on the data collected for the year 2005-06 through well-structured comprehensive schedule and various publications. The study has found maximum yield gaps in paddy and wheat in sub-mountainous regions in marginal and small categories of farmers; in maize in the central region for marginal farmers and in cotton in the south-western region for marginal farmers. These yield gaps can be abridged by using suitable doses of inputs to increase production level. The identified constraints faced by the farmers are higher cost of cultivation, non-availability of labour on-time, sharing of irrigation structure and frequent attacks of insects, pests and diseases. Major market tribulations have also been reported in the study.

Adoption of Integrated Pest Management in Cotton in Saurashtra Region – A Study

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This study has assessed the impact of adoption of IPM, has identified the factors influencing use of pesticides and has examined the extent of use of pesticides at farm level in cotton cultivation in the Saurashtra region of Gujrat state. The study is based on the primary data pertaining to agricultural year 2005-06. On the basis of a weighted score of IPM adoption, the sample farmers have been categorized as low, medium and high adopters of IPM. The study has revealed that use of pesticides in Bt cotton was highest by high IPM adopters, followed by low and medium adopters of IPM. The gross as well as net returns have also been found highest in high adoptions, followed by medium and low adoptions of IPM. About 50 per cent farmers have used pheromone/light trap and only about 19 per cent farmers have adopted the recommendations of collection of helicoverpa eggs, whereas none of the farmers has adopted IPM recommendations about release of chrysoperla, NPV and HNPV. Out of 25 different plant protection practices, 22 have been adopted by the farmers. Bio-pesticides have been used by only 8.75 per cent farmers. The cost of production per quintal has been found lowest in the case of high adopters, followed by medium and low adopters of IPM.

Impact of Lack of Technology Transfer on Rainfed Cotton: Economic Analysis in Southern District of Tamil Nadu

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The factors responsible for the existence of yield gap in cotton production in the Viruthunagar district of Tamil Nadu have been identified along with the technical and socio-economic constraints responsible for the existence of this yield gap. Three-stage purposive sampling method has been used for the selection of district, taluks and villages. Data pertaining to socio-economic status, farm details, cultivation methods, cost and returns, technological awareness and constraints in adoption of recommended technology have been collected from 60 farm households from the six villages of two taluks (Aruppukkottai and Tiruchuli). The analysis carried out using linear multiple regression, Garrett scoring and conventional techniques has revealed the total yield difference of 77 per cent in the cotton crop. The estimated linear yield gap function has shown that 68 per cent variations in yield were due to the variables included in the model. The study has revealed that increase of one unit in the application of phosphorus and one unit level of seed rate increase the yield by 2.754 kg/ha and 7.643 kg/ha, respectively. Factors like lack of knowledge on recommended doses of puts and time of their application, problems in identification of pest and diseases, lack of knowledge about required chemicals, and poor availability of inputs (certified seeds) in time and place have been identified as the major constraints to non-adoption of recommended technologies in cotton.

Impact of Genetically Improved (Jayanti) Rohu in India

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The genetic improvement being the essential means for attaining the sustained productivity gain in the freshwater aquaculture sector in India, the selective breeding programme for the genetic improvement of rohu undertaken by the Central Institute of Freshwater Aquaculture has been reported. The improved strain named '*Jayanti*' has shown improvement in the yield gain of 17 per cent per generation. The study has reported that the strain has already been tested in the research stations and research farms in various agro-climatic zones of the country. A limited and selective dissemination of the 2nd and 3rd generation improved stock has been made across the country, particularly among the farmers of Andhra Pradesh. The performance and impact of the strain has been estimated by collecting data from these farmers. The study has outlined the impact indicators and has estimated the actual as well as the potential impact of the strain under different scenarios of dissemination of improved strain in India. It has also estimated the return to the investment in the research and dissemination of the genetic improvement programme of aquaculture. The paper is based on a collaborative project of ICAR, India and WorldFish Centre, Malaysia, during 2004-2007.

Goat Farmers' Coping Strategy for Sustainable Livelihood Security in Arid Rajasthan: An Empirical Analysis

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Goat farmers' coping strategy under water-scarcity and changing resource situations in arid Rajasthan has been analyzed. Input-output model has been used to quantify the magnitude of linkages amongst different components of the farming system. The study has used primary data collected from randomly selected 60 goats-keeping households and 25 farm households without goats for the year 2004-2005 from Nagaur district in arid Rajasthan. Instead of opting for transhumance system, the farmers have been found innovative to evolve a farming system that allows sustainable production of grains for family as well as feed and fodder for maintaining their small ruminants. Three farming systems namely I –Rain-fed goat-based, II –Partially-irrigated goat-based and III –Rain-fed crop-based, have been delineated. In response to the emerging resource and environmental conditions, these goat farmers utilize the potential synergy of linkages among different components of the farming system. The innovative idea of farmers of keeping part of their land fallow for grazing their goats and sheep during lean seasons needs to be used as an opportunity to encourage the farmers to develop this fallow land as pasture with recommended legume and non-legume grasses. This model could be replicated in other arid regions of the country.

Use of Economic Efficiency Criteria in Technology Selection and Dissemination: Priority-setting for Mustard Production Technologies in India

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Considering the demand for edible oil and stagnation in its yield, technologies developed for rapeseed-mustard group of crops have been studied in terms of their efficiency parameters for five states, viz. Gujarat, Haryana, Rajasthan, Uttarakhand, and Uttar Pradesh. The yield increase over farmers plot, additional net monetary returns (ANMR), incremental benefit cost ratio (IBCR) and technology potency (TP) have been used to measure the efficiency of the demonstrated technology. The data from the component technology demonstrations of the front line demonstrations under All India Coordinated Research Project on Rapeseed-Mustard have been used for the study. The need for a cumulative index incorporating all the individual efficiency parameters has been highlighted and a cumulative index has been constructed based on assigned weights, reflecting the relative importance of each of the efficiency criteria for individual states and technologies. The ranking of technologies across states has shown that better acceptability for the improved technology dissemination will result from popularising 'Sulphur Application' in Rajasthan and Gujarat and 'Plant Protection' technology in Haryana, UP and Uttarakhand.

Study of Supply Side Constraints in Tur (Arhar)

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The present study is focused on the historical pattern of area, production and yield of tur (arhar), regional variations, potential yield gaps, returns in tur cultivation, impact of its import on domestic prices and effect of price and non-price factors on acreage adjustment behaviour of farmers. The overall growth patterns in area, production and yield during the period 1971-2006 at the country level have not shown any significant change. The growth pattern has indicated that the major supply constraints are: decline in area under tur, especially in the major tur-growing states, and non-improvement in yield of tur over the years. Profitability in tur production has also been found declining in most of the states and could be the major reason of declining area under tur in various states. The study has indicated that there is a possibility to enhance the production of tur by 195 per cent, if the yield obtained on national demonstration trials is achieved at farmer's fields. The impact of import of pulses on domestic prices has shown that if import price and minimum support price are high, the farm harvest price will also be high and if quantity of imported tur is more, the farm harvest price will be low.

Supply Side Constraints to Pulses Production in India

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The importance of pulses in providing protein and essential nutrients to the large population of India necessitates the evaluation of constraints to pulses production. The pulses are accorded lower priority in the cropping systems. These crops are adversely affected by a number of biotic and abiotic stresses, which are responsible to a large extent for the instability and low yields. Drought, temperature and salinity are the major abiotic factors limiting the crops yield in India. Low water-holding capacity of soil in peninsular India, high water-holding capacity on verti soils, high salinity and alkalinity in semi-arid tropics and irrigated areas have been found to cause great damage to pulse crops. More than 250 insect species have been reported to occur on pulses in India, causing a loss of 2.0-2.4 million tonnes of pulses annually. It has been observed that pulses suffer from inherently low-yield potential and are a physiologically inefficient group of plants compared to cereal crops. To increase the production of pulses, it is essential to develop high-yielding varieties of pulses, suitable to particular agro-climatic region. The efficiency of marketing of pulses should also be improved so that producer is able to get his due share in consumer rupee.

Impact Assessment of Technological Interventions and Supply Side Constraints in Migratory Sheep Production System: A Study in Ajmer District of Rajasthan

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The impact of technological interventions on yield, cost, income, employment and food security in migratory sheep production system has been assessed for the year 2004 over the base year 2001. The constraints being faced by sheep farmers have also been identified. The study has revealed that migration starts from the month of November and the flocks of sheep start returning to the native place in July, i.e. after 8 months. The resource endowments such as family workers have direct and landholdings have inverse bearings on the migratory flock size. The study has reported an impressive increase in productivity and income realization due to technological interventions (breeding, healthcare, and nutritional supplementations) in migratory sheep-rearing in the Ajmer district of Rajasthan. Some spillover impacts of technological interventions have also been reported, specially in breeding component as the participating sheep-owners could sell more than 80 *patanwari* crossbred lambs to other migratory sheep-owners for breeding purpose.

Technological Impact of Precision Farming under Tomato Cultivation in Dharmapuri District of Tamil Nadu

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Precision farming is one of the recent technologies which is being disseminated by the Government of Tamil Nadu, particularly for vegetable and flower cultivation. Among vegetables, tomato is an important vegetable and it covers a major area (27,000 ha) of Tamil Nadu with production of 2.58 lakh tonnes and productivity of 9.5 t/ha. The off-season tomato fetches good remunerative prices due to its good demand. The paper has assessed the technical efficiency of precision and non-precision farmings and has also compared the profitability of tomato cultivation under these two systems. The study has revealed that net return realized per ha of tomato was higher (Rs 2,51,895) in precision than non-precision (Rs 1,03,939) farming. The mean technical efficiency has been found higher (93%) in precision than non-precision (88%) farming. The study has concluded that precision farming is technically more efficient than non-precision farming and should be disseminated on a large scale in water-deficient areas.

Technological Adoption and Production Performance of Maize in Tribal Areas of Madhya Pradesh

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The adoption pattern of new maize technologies and their impact on yield, cost reduction and resource-use efficiency have been reported along with the probable constraints. The study is based on the primary data collected from 100 maize growers in the tribal Shahdol district during 2005-06. Cost and returns analysis, resource-use efficiency, technological adoption index, etc. have been used. The study has revealed that maize yield had increased significantly with the adoption of composite/hybrid variety of maize in all farm-sizes. An important observation reported by the study is that there was no significant difference in maize yield across different farm-sizes, which showed that smallholders were equally efficient in terms of maize production. The study has suggested the use of biotechnology for the development of new traits of maize. The study has argued that the future development of maize in the desired form is possible by coordinating the farm policies and farm supporting services as a backward and forward integration in the light of growing demand for maize.

Protected Cultivation of Vegetables under Low Cost Structure: Emerging Technology for Livelihood Security in Western Himalayan Region

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The study undertaken in the Garhwal region of Uttarakhand has reported the feasible technology for smallholders in mid (1000-1500 m msl) and high (1500-2400 m msl) hills for their livelihood security and their inclusion in high-value supply chains. Technical and economic feasibility of vegetable production under an indigenous low-cost polyhouse has been examined and recommendations for the sustained and improved livelihood have been provided. The study has revealed that benefit cost ratio is higher under indigenous low-cost polyhouse in case of capsicum (2.20) and tomato (1.73) than open cultivation. High-yielding cultivars such as Manhattan, Bharath and Mallika of capsicum and Naveen and Nutan hybrids of tomato have been recommended for cultivation in mulch under polyhouse conditions due to better yield potential and lower incidence of pests. The study has concluded that protected vegetable cultivation is technically sound, economically viable for livelihood security and is gender friendly.

Supply Side Constraints in Production of Pulses in India: A Case Study of Lentils

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The study has estimated the yield gaps between research station and farmer's fields in production of lentil in India and has identified the sources of yield gaps. It has argued that by reducing yield gap, the production of lentil can be doubled in India. The management of diseases (80% increase in income) and improved seed adoption (40% increase in income) have been identified as the major sources of yield (net return) gaps. It has observed that in recent years, large tracts of rice fallows have been replaced by rice-lentil-cropping system in north India due to introduction of short-duration varieties. There is also a scope for expansion of area under lentil by replacing wheat with lentil in water-deficient and resource-poor regions. The study has concluded that the availability of lentils can be increased by 7 per cent by reducing post-harvest losses.

Growth Performance, Inputs-use Pattern and Adoption Gaps in Recommended Technology for Ajwain (*Trachyspermum ammi* L. Sprague ex Turrill) Production in Chittorgarh District of Rajasthan

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The growth rates in area, production and productivity, inputs-use pattern and technological gaps in production of ajwain have been reported based on a study conducted in the Chittorgarh district of Rajasthan, by collecting primary data for the agricultural year 2003-04. The study has brought out that area, production and productivity of ajwain in the district as well as state have been fluctuating widely over the period 1991-92 to 2000-01. The area under ajwain in the Chittorgarh district as well as Rajasthan state has been growing and an increasing trend has been observed in per cent share of the Chittorgarh district in total production of ajwain in the state. Due to fluctuations in area and production, non-significant compound growth rate in productivity has been recorded with negative growth. The paper has concluded that area under the ajwain crop is almost stagnant with wide fluctuations in yield. Therefore, emphasis should be given to encourage the adoption of recommended package of practices and development of irrigation infrastructure, as crop is grown completely on the rainfed lands.

Production and Export Performance of Indian Fishery Sector

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The study has examined the growth performance, potential markets and prospects for the export of Indian fishery products in the framework of pre- and post-reforms, WTO regime, geographical distribution of these exports and current trends in Indian marine products exports. Fish production has increased from 0.75 million tonnes in 1950-51 to 6.90 million tonnes in 2006-07, registering a compound growth rate of 4.53 per cent. However, rates of growth in total fish production and marine production have been found to be higher during pre-liberalization than post-liberalization period, but the rate of growth in inland fish production has shown a reverse trend. Fish and fish products have emerged as the largest group in agricultural exports of India. The study has revealed that the export value of marine products has increased at the rate of 16 per cent per annum as compared to export quantity and export unit value. Among the agricultural commodities exports, marine products have been found to contribute 14.77 per cent to the total value of agricultural commodities exported. The study has stressed on the need to augment domestic fish production to meet the gap of 1.5 Mt. It has suggested that necessary infrastructural facilities may be created to improve production efficiency. To improve the unit value realization, it is necessary to tap the potential fish markets in the European Union, Norway, Italy, Greece, Netherlands, China, Chile, Spain, etc.

Utilization Pattern of Marketing Channels to Sell Groundnut by Farmers in Agro-climatic Zone IVa of Rajasthan

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The utilization pattern of different marketing channels to sell groundnut by the farmers in Zone IVa (a major groundnut producing zone in Rajasthan) has been studied. The utilization of marketing channels has been found higher by large farmers than small and marginal farmers. Of the 13 marketing channels studied, a majority of groundnut growers have been found utilizing the marketing channel 'village merchant' (80.4%), followed by 'village trader', 'retailer', 'broker at home', 'local market', 'local farmer' and 'consumer'. The utilization level has been found low for marketing channels 'mandies at city', 'regulated market', 'co-operative societies', 'oil-expeller (miller)', 'commission agent' and 'wholesaler'. The study has also indicated that there is no significant difference amongst large, small and marginal farmers regarding utilization of different marketing channels in the study area.

Economic Analysis of Contract Broiler in Coimbatore District and its Impact on Farmers

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The study conducted in the Coimbatore district of Tamil Nadu has identified the existing system of contract broilers. It has examined the awareness level of farmers and their participation in contract broiler. It has determined the extent of benefits to farmers and has examined their response to the current pricing mechanism. It has also identified the constraints in contract broiler. About 81.7 per cent of the farmers belong to the age group 30-60 years. In about 80.0 per cent farmers, the family size is of 4-8 members. A majority of the farmers have secondary education. Most of the farmers involved in the poultry production have been found small and medium farmers. About 46.6 per cent of the farmers have 7-8 years and 21.7 per cent farmers have 9-11 years of poultry experience. The company representative has been found to be the main source of awareness generation about contract farming. The system of agreement is largely oral. The pricing of the produce has been found to be based mainly on FCAR ratio. From poultry production, farmers get average of Rs 12,000 per batch as net income. The main monetary benefit has been found as higher returns and non-monetary benefit as reduction in price risk. A majority of the farmers have expressed satisfaction regarding pricing method and services provided by the company.

A Study on Marketing of Wheat and Mustard in Allahabad District of Uttar Pradesh

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This study has been conducted during the year 2007-08 in the primary market (Jari) and secondary market (Mutthiganj) in Allahabad by randomly selecting 45 wheat and 25 mustard producers. The main marketing channel for wheat has been found as: Producer → Wholesaler → Retailer → Consumer. For mustard two channels have been recorded i.e. Producer → Wholesaler → Retailer → Consumer, and Producer → Wholesaler → Oil miller → Retailer → Consumer. The producer's share in consumer's rupee in wheat has been found as 72.9 per cent, wholesaler's margin as 9.5 per cent and retailer's margin as 12.6 per cent. The total marketing cost in mustard has been found lower in the first (4.2%) than second (8.9%) channel. The producer's share in consumer's rupee has been found higher in the first (76.3%) than second (71.0%) channel. The total marketing cost has been found as 8.9 per cent. The major problems faced by the producers in the study area have been identified as lack of grading and standardization system, lack of insurance facility, poor transportation facility, lack of market finance, lack of information, long-chain of intermediaries and poor storage facilities in the markets.

Constraints in Adoption of Improved Potato Production Technologies in Bihar

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The adoption of modern techniques of potato production has been studied and constraints in their adoption have been identified by conducting a survey in the Nalanda and Muzaffarpur districts of Bihar. The data for the past five decades (1949-50 to 2002-03) has shown a positive growth rate in terms of area (2.77%), production (3.73%) and yield (0.97%) of potato production in the state, but it is far below the national values. Low yield of potato in the state has been attributed to poor adoption (69%) of improved agronomic practices by farmers. The major constraints in adoption of improved technologies have been identified as non-availability of good quality of improved seed varieties at affordable price, inadequate cold storage space, and lack of knowledge about the improved package of practices, particularly about plant protection. Besides, farmers have also reported a number of infrastructural and institutional bottlenecks like, poor road network, erratic power supply for irrigation, poor density of regulated market, fragmented landholdings and poor availability of desired quality of fertilizers on time. The study has suggested that government should address these problems of farmers for the development of potato production in the state.

Impact of Globalization on Marketing of Farm Inputs in Uttar Pradesh — An Analysis

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Marketing of farm inputs is as important as marketing of product, but it is often neglected by the market researchers. A timely and adequate supply at fair prices of farm inputs — seeds, chemical fertilizers, plant protection chemicals, farm equipments, electricity, diesel and credit — is of great significance in farm output. The study has revealed that farm production and consumption of agricultural inputs like fertilizer and seed have increased after the onset of globalization process. The globalization has brought a significant change in the seed industry of Uttar Pradesh, which is surging ahead into new directions for the purpose of producing breeder and foundation seeds and distribution of certified seeds among farmers.

Demand and Supply of Paddy Seed in Konkan Region of Maharashtra

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The study has estimated the demand and supply of paddy seed in four districts of Konkan region of Maharashtra, based on the data for agricultural year 2003-04. The main source of supply of certified seed has been found to be Maharashtra Seed Corporation Ltd, Akola (94.6%), followed by the private agencies (Krishi Seva Kendras) (4.2%) and Dr Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli (1.2%). The seed replacement rate (SRR) has been observed maximum (20.0%) in the Raigad district, followed by Thane (18.0%), Ratnagiri (9.7%) and Sindhudurg (6.6%) districts. At the overall level, the seed replacement rate has been found as 15.1 per cent for certified seed and 52.8 per cent for quality seed in the Konkan region. The maximum SRR (15.8%) has been observed in medium size-group, followed by large (15%) and small (12.7%) size-groups. But, the projection of future supply of certified seed has shown a negative trend. To achieve SRR of 25 per cent, there would be demand of 46,172 quintals for certified seed in 2015. The main constraints in seed replacement have been identified as high price of certified seed, followed by non-availability of desired seed variety and non-availability of seed in time.

Credit Requirement and Supply for Cereal and Sugarcane-based Farming Systems in Mid-Western Plain of Uttar Pradesh

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This study, conducted in the districts of Shahjanpur and Bareilly in Uttar Pradesh, has estimated the credit requirement, supply and gaps for the predominant farming systems and has identified the prospects for and constraints in adoption of integrated farming system in the area based on the data collected through personal interview during the year 2004-2005. The study has shown that cereal-based, followed by sugarcane-based farming systems are dominant in the study area. Rice, wheat and sugarcane cover about 86 per cent of the cropped area in mid-western plain zone. The study has revealed that about 38 per cent households had acquired credit for agricultural inputs and farm machinery, while 62 per cent households had taken crop loan. But, none had borrowed the credit for allied farm businesses like dairying, poultry, piggy, beekeeping, etc. Investment on different inputs and farm-sizes has been found inversely related. The credit gap per farm has been recorded wide in cereal-based (78.2%) than sugarcane-based (72.2%) farming system. The narrow credit gap in sugarcane-based farming system has been due to the involvement of large farmers, who have easy access to institutional loan. Fragmentation of landholdings, scarcity of labour, low yield of local varieties, price volatilities due to changing global market, and scarcity of own-fund have been found as the major constraints in integrated farming system.

Demand for Environmental Quality and Supply-side Constraints in Sustainable Agricultural Production Technology

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This paper has analyzed the existing system of market for bio-inputs in the state of Kerala. It has explored the behavioural and socio-economic factors that influence farmers decision-making with respect to environmental-safe production technologies, focusing on rice farming. The organic input market has been found to be constrained by insufficient trade support for quality inputs. None of the sample farmers uses biofertilizers and the level of organic manure-use has been found lower than the recommended level. The main source of organics continue to be own-farm or local production and dependence on commercial sources has been observed only secondary. The majority of market samples have been found to be of lower quality than the prescribed standards. The study has pointed towards the potential in expanding of sustainable agriculture, provided appropriate policy measures are adopted. It has been suggested that the extension programmes and trainings may be focused on small growers and beginners in farming, as the chances of their adoption of these technologies are more.

Dynamics of Area, Production and Productivity in Major Fruit Crops of India

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Considering the growing importance of fruit crops, it has become imperative to estimate the growth rate, variability in area, production and productivity of major fruit crops in India. The contribution of area and yield and interaction (area and yield) effect on the overall growth of fruit production using decomposition approach have been reported in this study. The area and production of fruit crops have registered a positive growth trend during the study period, 1970-71 to 2006-07. In the case of yield, a positive growth has been observed in banana and papaya, whereas in the case of citrus, mango and guava, the per hectare growth has been found negative. In most fruit crops, instability in area, production and productivity has been recorded very high. The decomposition analysis has suggested that positive growth of production is mainly due to area, while contribution of yield is negative. The study has suggested adoption of better horticultural techniques to enhance the production of fruit crops as area diversion from cereal to fruit crops may threaten food security. Awareness generation and trainings will help in adoption of better horticultural techniques and provide employment and income to fruit farmers of the area.

Rejuvenating Uttar Pradesh Agriculture: Management of Supply Side Constraints

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The study delineating the supply-side constraints of Uttar Pradesh agriculture, has revealed the need of an integrated approach to address the problems of degrading soils and inefficient use of water. The extension mechanism of the state needs a complete reorientation to address not only the problems of production but also of marketing. The expenditure on agricultural research and education has been found almost negligible, which needs rectification. Agricultural marketing reforms are also needed to harness the agribusiness potential of the state. The study has advocated the adoption of State Agricultural Produce Marketing Act (Model Mandi Act, 2003) to ensure better prices to the farmers and attract private investment in the agri-retail sector. It has suggested that the Uttar Pradesh Mandi Board should act as a facilitator rather than regulator and a higher proportion of its revenue should be utilized for market development. The Market Committee should play a major role in creating such infrastructural facilities as laboratories for food testing and for enforcing sanitary and phytosanitary standards.

Establishment and Maintenance of Arecanut Plantations under Different Water Management Regimes: An Economic Analysis

B. Chinnappa

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The economics of establishment and maintenance of arecanut plantations have been investigated under different water management protocols, based on the primary data collected from 150 arecanut growers; 75 adopting drip method of irrigation (DMI) and 75 flood method of irrigation (FMI). It has been observed that arecanut gardens with drip irrigation require higher investment (Rs 5,30,839/ha) than gardens without drip irrigation (Rs 4,19,046/ha). The study has revealed that establishment cost of arecanut could be reduced by growing intercrops, by 42.3 per cent under DMI and 44.2 per cent under FMI. The maintenance cost of gardens has been found lower under drip irrigation than flood irrigation due to substantial savings in labour cost. The drip-irrigation gardens have registered 25 per cent higher yields as compared to gardens under flood irrigation. The benefit cost ratio has suggested that gardens under drip irrigation could generate higher gross and net returns for every rupee of investment (1:3.87). Establishment of drip irrigation being highly capital-intensive, the study has suggested provision of higher subsidies to small and marginal farmers in the area.

Cost Benefit Analysis of SRI Technique in Paddy Cultivation

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The paper has analyzed the cost effectiveness of SRI technique in paddy cultivation in the western zone of Tamil Nadu by randomly selecting 15 adopting and 15 non-adopting farmers. The cost incurred for nursery has been found lower (5.47%) in SRI than conventional (14.77%) method. However, from the main field activities up to harvest, the cost incurred has been found higher in SRI (94.53%) than conventional (85.23%) method, mainly due to higher manpower requirement in transplanting and harvesting operations. The average yield obtained was 1.35-times higher by SRI adopters than non-adopters in one acre of paddy in the sample farms. The average net profit per acre has been observed higher (Rs 16566) by SRI adopters than non-adopters (Rs 8848). The major reasons for adoption of SRI technique have been low seed requirement, less area under nursery, less duration of seedlings maturity, less water requirement and higher yield. Higher labour requirement and lack of skill among the farmers have been identified as the major constraints being faced SRI adopters. The study has suggested that training-cum-field visits may be organized for the paddy growers to promote SRI technique on a large scale to increase water-use efficiency in water-scarce areas.

Technical Efficiency in Crop Production: A Region-wise Analysis

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The level of technical efficiency in crop production among different farm-size categories has been investigated along with the influence of various farm-specific socio-economic variables. The mean value of gross income has been found highest for the central region, followed by south-western and sub-mountainous regions. The production function estimates have pointed out the presence of disguised employment in the sub-mountainous region. The technical efficiency has depicted a wide variation across regions of the state; the average value being 66 per cent in the sub-mountainous region, 78 per cent in south-western region and 90 per cent in central region. The main drivers of inefficiency have been identified as experience and age of the farmers. The study has observed that different regions of the state would benefit differently from the same set of interventions and therefore, policy interventions should be developed at localized levels.

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