A Study on Economics of Hill Agriculture of West Bengal

B.K. Bera and A.K. Nandi*

The study attempts to make a comparative study between the hill regions of Darjeeling district of West Bengal and the state itself based on secondary data as well as primary data collected from different sources in relation to demography, work participation rate (WPR), sector and sub-sector wise distribution of workers, number of holding size along with operational holding, cropping pattern, cropping sequence with economics of crop cultivation etc. The study on the demographic assessment revealed that the population has grown in all regions over a successive census period, but with a differential decadal growth rate. Over the entire study period the decadal growth rate has dropped down drastically in the hilly regions and West Bengal as a whole, but the Darjeeling district showed a marginal increase which may be due to the influx of population into Siliguri the lone sub-division of the Darjeeling district in the plains. Work participation rate in West Bengal and the hilly region has gone up marginally by 3.59 per cent and the Darjeeling district as a whole showed a declining trend because of the closure of many tea gardens and the lack of new labour intensive manufacturing industries in this region. The female work participation rate in West Bengal has steadily gone up along with the other two regions though percentage figures showed a reverse trend but still remained higher than West Bengal signifying the dominance of female labour in the hill economy. The occupational distribution of total workers, discerned that with the passage of time, educated people were reluctant to take cultivation as primary occupation, i.e., agriculture was no more a priority sector to the new generation work force and they were interested to work in other sectors including secondary and tertiary sectors and a small proportion having no alternatives has opted to work as agricultural labourers. The study on the agricultural situation in the Darjeeling district and West Bengal in terms of the exponential growth rate of area, production and productivity of total rice, total cereals and total food grains showed a positive growth rate for all three parameters taken into consideration for both regions except the area under total cereals in the Darjeeling district and the total food grains area in both the regions which were estimated to be negative. The lower value of these parameters for the district may be due to the traditional system of cultivation without the application of chemical fertilisers, plant protection chemicals, lack of proper water management and most important a heavy dependence on the local varieties of crops in place of high yielding varieties. The land holding pattern and their change over time followed the same trend and per

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capita availability of the operational holding declined in both the regions over time, but still remained higher in the Darjeeling district in comparison to that of West Bengal and the land distribution was more skewed and further aggravated overtime in the Darjeeling district. A comparative study on the cropping pattern and its change over time between these two regions revealed that out of 72.77 and 59.82 per cent of the total cropped area under total cereals, rice accounted for 67.56 and 30.44 per cent in West Bengal and the Darjeeling district respectively in 1980-81 and the domination of total cereals vis-à-vis total rice curbed to some extent in both regions in 2004-05 and the percentage allocation area to other crops including vegetables, fruits, total oilseeds, tea, ginger etc. showed an increasing trend signifying a shift in the cropping pattern, particularly in the Darjeeling district. Again the marginal farmers cultivated more intensively as compared to the other group of farmers and land use intensity was found to be the highest during the pre-\textit{kharif} season followed by \textit{kharif} season. The ordering of crop sequences depending on the net return showed that rice-carrot-maize gave the highest remuneration than the rice-gladiolus combination under a fully irrigated condition, but rice-wheat-fallow yielded the highest return followed by rice-follow-maize under a purely rainfed situation. Endowed with a unique agro-climatic condition and being a natural habitat of a wide range of rare plant species, the hilly region of the Darjeeling district of West Bengal has tremendous potentiality for economic development through crop diversification. Production and marketing of high value horticultural crops, particularly flowering plants like gladiolus, orchid, cactus and varieties of seasonal flowers with fascinating colours as planting materials as well as cut flowers which have a heavy demand in the domestic and international market could be the take off stage for commercialisation. Besides the cultivation of off-season vegetables under the protected condition and the seed production of major crops including spices and condiments supported by cheap labour provides ample scope for augmenting farm income. For sustained economic development, a sustainable eco-friendly organic farming system can be promoted with less effort as farmers already raise crops applying chemical fertilisers, plant protection chemicals etc. at minimum level. In spite of having immense multi-faced prospects of agricultural development, the people of the region are forced to live in extreme poverty because of the fact that most of these natural resources remained untapped till date. Scarcity of the irrigation facility is the major constraint in the development of the region. The development of micro watershed projects ensuring irrigation facilities of at least one third of cultivated area could have turned things around. Infrastructural facilities like transportation, storage, market information system etc. are also impeding development of the region. A concerted effort to address these problems and the development of an efficient marketing system coupled with the complete elimination of middlemen might help the marginal and small farmers dominate agriculture to get rid of long pending misery.
Off-Season Vegetable Cultivation – A Remunerative Enterprise for Small and Marginal Farmers of Himachal Pradesh

Brij Bala†, Nikhil Sharma and R.K. Sharma‡

The study attempts to investigate the various costs and returns involved in the production of major off-season vegetables in Kullu district of Himachal Pradesh. The study was carried out in two vegetable dominated developmental blocks, namely, Banjar and Kullu of Kullu district. Primary data was collected from a sample of 100 farmers using the survey method and the data on various socio-economic aspects, cropping pattern, inputs used and crop yields were recorded. The study was confined to selected vegetables like tomato, cabbage, cauliflower and pea. The average operational holding on the sampled farms was 0.64 hectare and a cropping intensity of 250 per cent was realised. Of the total cropped area, vegetables occupied above 80 per cent area. The study revealed that per hectare cost A1 was highest for tomato followed by cabbage. It was minimum for pea among the selected vegetables. In all the crops except for tomato, cost A1 was less for the large farms category as compared to the small farms. Plant protection costs were the major constituent of cost A1 incurred for the production of all crops followed by the expenditure on seed and fertilisers. Vegetables being the labour intensive crops, incurred significantly high costs for human labour ranging from Rs. 13,555 to 14,999 per hectare. Per hectare gross returns were the highest for tomato followed by cauliflower, cabbage and pea. The net returns over cost A1 also varied in the same fashion. The cost of plant protection can be reduced by educating the farmers about the integrated measures of pest management and by adopting organic farming practices. The study suggested that if some handy and efficient tools are made available to the farmers for performing intercultural operations like hoeing, weeding etc., the labour cost can be reduced and the enterprise can become remunerative.

Problems and Prospects of Pineapple Marketing in West Garo Hills of Meghalaya – An Economic Evaluation

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Pineapple marketing plays a pivot role in fostering and sustaining the tempo of rural development in the West Garo Hills of Meghalaya. An attempt has been made in this paper to identify the different marketing channels, price spread, marketing

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efficiency and strategies in pineapple marketing, examine the marketing constraints and suggest some policy implications for the improvement of pineapple marketing in the study area. The present study was undertaken with the sample of 60 pineapple growers comprising 30 small (< 1ha of pineapple cultivation), 20 medium (1 - 2ha) and 10 large (> 2 ha.) farmers of pineapple cultivation from two villages, namely, Bikonggre and Kangkaronggre of the Dadenggre community development (CD) block of the West Garo hills, Meghalaya through the stratified random sampling method. Besides, a sample of 10 wholesalers, 10 traders, 15 retailers and 15 village beoparies in the major marketing centres namely the Chibinang and Phulbari ghat of the Sellsella CD block of the West Garo hills were randomly selected. Primary data was collected from the total sample of 60 pineapple growers and 50 pineapple market functionaries through the personal interview method with the help of a specially designed schedule covering all aspects pertaining to the agricultural year 2008-09. The findings of the study revealed that the low price in wholesale market during glut situation, seasonal fluctuation in prices due to the irregular supply were special features of marketing problems faced by the pineapple growers of the study area. Obviously, a sparse inhabitation and geographical barriers worked as the limiting factor in creating desirable overhead infrastructure for agricultural marketing in the remote hills region. The remote backward and tribal areas still has transportation and communication problems that needs to be given due consideration. The study highlighted that the prospect of pineapple marketing in Meghalaya is bright as the trend of other traditional crop production in the potential areas is quite encouraging for organic farming. Based on the findings of the study the following policy implications are suggested for improving market infrastructure, direct and group marketing, establishment of modern marketing and processing units, market integration and the improvement of the overall efficiency of the marketing system in the study area. New paradigm and challenges are needed for the pineapple growers of Meghalaya in solving problems like recurrent price fluctuation, high marketing, storage and transportation cost, non-availability of adequate storage facilities, post harvest losses and lack of a competitive marketing system. There is an urgent need for promoting the producer’s co-operative and providing adequate short term credit facilities particularly in the rural areas. In order to hedge the risk of pineapple production and marketing, it is imperative to develop market intelligence services and the introduction of support price and insurance scheme in the West Garo hills of Meghalaya.
Enhancing Smallholder Dairy Farmers’ Market Participation in Uttarakhand: What Factors to Focus Upon in the Hills vis-à-vis Plains?

D. Bardhan†

The study has focused on analysing the factors that determine the dairy farmers’ choice of marketing channel and level of commercialisation or intensity of market participation. A multinomial logit model was employed to ascertain the major factors in influencing the producers’ choice of marketing channels. The main aim of this study was to analyse market participation through the application of Chow’s seminal test to examine the differences between data from diverse regions (plains and hills). A multivariate regression model was applied in this analysis to assess the level of market participation. The findings of the study revealed that given the right institutional incentives and market infrastructure, the marginal and small landholders are capable of scaling up milk production and hence commercialise their dairy enterprises. The producers’ level of market participation – both in terms of the proportion of milk producing households selling milk and marketed surplus (per cent) - was significantly higher in the plains as compared to the hills. Co-operatives played a more important role in milk procurement in the hills than in the plains. The results of the multinomial logit analysis indicated that an increase in the scale of milk production led to a shift away from the co-operatives to the market as point of first sale them milk production and extension contact emerged as the two most important policy variables favourably influencing the intensity of market participation. Some indications also emerged about the farmers’ intensity of market participation being more responsive to price in the hills than in the plains. The distance to the market negatively influenced the likelihood of the producers’ market participation irrespective of the hills or plains. The study presents quantitative guidelines on what issues to focus upon for addressing the apparent institutional constraints that inhibit the ability of small-scale dairy farmers to favourably access the milk markets in Uttarakhand. The findings also provided guidelines that would enable the implementation of policy interventions that reliably address salient challenges which may vary across the agro-ecological sub-regions within the state.

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Cultivation Practices of Strawberry in the Western Hilly Tracts of Maharashtra: Prospects and Emerging Issues

Deepak Shah*

Although the cultivation of strawberry is noticed in 4-5 states of India, the major bulk of about 85 per cent of India’s total production of strawberry comes from the Western hilly tracts of Maharashtra. The farmers belonging to the twin hill towns of Panchgani and Mahabaleshwar – the strawberry capitals of India – generally have brisk business through the sales of the crimson-hued fruit during the period between December and March, where strawberry typically thrives when the temperature is around 13-14 degrees Celsius. Since strawberry has significant demand throughout the country from urban consumers due to its high source of vitamin, significant levels of mineral contents, ellagic acid, rich aroma, fabulous flavour, important dietary components, etc., it was thought prudent to investigate the various issues relating to strawberry with specific reference to its cultivation technique, economics of cultivation, strengths, weaknesses, opportunities and threats to its cultivation and several other related issues. The present investigation clearly underscores the fact that despite having several important characteristics, the strawberry cultivation is limited to specific areas. The restricted production of strawberry is mainly due to its dependence on specific climatic conditions, soil type and technique of production. The extreme climatic conditions like the cold wind during winter and high temperature during summer hamper the production of fruits and runners. However, extreme climatic conditions can be countered by plasticultural techniques like mulching, use of low plastic tunnels and micro-irrigation systems. Though strawberry requires a significantly high cost of cultivation, the returns are equally high and one can expect as much as Rs. 4.00 lakhs of net profit margin from one hectare of strawberry orchards under a suitable climate and well managed efficient cultivation practices. However, the adverse climatic conditions and some emerging threats to its cultivation, viz., threats caused by diseases like mildew, leaf spot, leaf blight and other fungal attacks on the leaves of strawberry plants – white spots on the leaves, and important pests of strawberry such as spider mites and cutworms, etc. might adversely affect the cultivation of strawberry. Besides the strawberry has shorter shelf life and higher rate of perishability and lack of money management, plan for the future growth and realistic view followed by processing units with respect to the production of products are some other weaknesses encountered by the farmers in the cultivation of strawberry. The findings further reveal that by using plasticultural techniques like plastic mulching, plastic punnets, etc., there is significant scope to revolutionise the high-density strawberry cultivation.

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Technology Adoption, Profitability and Yield Gap Analysis in Rice Cultivation in Hills of Uttarakhand

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An attempt was made to study the technology adoption, profitability and yield gap in rice cultivation in Bageshwar district of Uttarakhand. The study was conducted to characterise rice cultivation practices at three different altitudes, viz., high, middle and low. For the purposes primary data were collected from 42 farmers of Bageshwar block for the agricultural year 2007-08. To work out cost and returns of rice cultivation, CACP cost concepts were used and a technology adoption index was prepared for each and every sample farmer to estimate the level of technology adoption. The yield gap was estimated for rice across altitudes. Determinants of yield gaps were identified by using regression analysis. Rice, wheat, mandua and barley were the first four principal crops of the study area. The study indicated that cropping intensity of the study area was 209.74 per cent but crop diversification was needed to maintain the productivity of soil and to make farming more profitable. More than 60 per cent farmers belonged to the category of medium level of technology adoption. Therefore, technology adoption cannot be said to be satisfactory in the study area. The level of technology adoption was found relatively poor at high altitude. Hence, there exist ample scope for improvement in the status of technology adoption at different altitudes in rice cultivation. In spite of the fact that farmers adopted improved varieties of rice at all the altitudes but overall average yield levels was low, consequently large yield gaps prevailed in the study area. Yield gap varied widely at different altitudes and it was lowest at low altitude. It may be due to lack of irrigation facilities and low use of improved varieties. Thus there exist scope to improve the productivity of rice in the study area for which particular attention is required to be paid by the farmers’ as well as government. Regression coefficients on determinants of yield gap revealed that technology adoption level is one of the important determinants of yield gap. Therefore, farmers need to be encouraged to adopt the full package of practices, create irrigation facilities like construction of water storage tank wherever possible. Besides the farmers of the block should be made more accessible to visit agricultural scientists/ADOs to acquaint them with the modern practices of rice cultivation and to encourage the use of certified seeds from authentic sources.
Economics of Production and Disposal of Honey in Pithoragarh District of Nainital of Uttarakhand State

Archna Shukla*, Ranjana Chaudhary**, Shailja Singh** and Balwant Singh‡

An attempt has been made to study the production and export potential of honey by the small and cottage industries corporation in Pithooragarh district of Nainital in Uttarakhand State of India. Beekeeping as an economic enterprise is a relatively new venture in Uttarakhand State. Beekeeping activity has now generated widespread interest among the Uttarankhand. Using two stage random sampling technique a sample of 80 beekeepers consisting of 27 stationary and 53 migratory beekeepers were randomly selected and the data were collected from the individual beekeepers pertaining to the agricultural year 2003-04. The farm wise honey production increased and was 902.40 kg and 3973.70 kg per annum on the stationary and migratory bee farms respectively. The summer yield has 5 to 8 per cent higher than the spring season. The marketed surplus of honey was about 96 per cent and 99 per cent of the total production on the stationary and migratory bee farms. As far as the mode of the marketed surplus of honey is concerned a large chunk of it was marketed through the wholesalers proportion of honey, marketed through the bee keeper’s co-operative society and was found to be 18.12 per cent on stationary and 37.48 per cent on migratory farms, there by indicating that the bee keeper’s co-operative has yet to prove its worth in the study area. As apiculture has proved to be a profitable enterprise, short term institutional credit should be made available to the beekeepers for buying the necessary tools and equipment and to the intermediaries for handling a higher volume of honey. Special attention should be given for financial support to the small keepers for increasing their bee boxes as well as honey production (as they suffer more from unemployment) the government and NGOs should come forward with helping hands and active support in training the unemployed educated youths and to supply the necessary tools and equipment at minimum cost. The findings of the study indicated that bee keeping in India has made steady progress under the Khadi and Village Industries Commission established in 1956 which helped to increase honey production upto 10,262 metric tonnes in 2003-04 with an average yield of 9.37 kg per colony. The study suggests that there should be migration of all bee colonies to enhance the income of the beekeepers. Further the beekeepers should be encouraged to sell honey through co-operatives.

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Performance of Production, Processing and Trade of Fruits and Vegetables is Himachal Pradesh vis-à-vis Other States

Arimardan Singh†, Jitendra Kumar‡, M.M. Rajput* and Uma Rashmi‡

The study deals with the performance of production, processing and trade of fruits and vegetables in Himachal Pradesh. India is the second largest producer of fruits and vegetables in the world. The major fruits grown in India are mangoes, bananas, papayas, grapes, apoplestics and vegetables are onions, potatoes, tomatoes, chillies, cabbage, cauliflower, radish, carrot etc. In Himachal Pradesh the apple is mainly cultivated in the district of Simla Kullu, Kinanaur Mandi and Chamba. At present 46,600 farmers are engaged in fruit cultivation in the state. The fruits industry provides 85.5 million man days employment. The State Government is placing a lot of emphasis on the adoption of modern scientific technology for plant, soil, water management and pest control. In 2004-05 the State Government provided a subsidy of Rs. 2.76 crores pesticides alone. There are 115 progeny-cum-demonstration orchards and nurseries and 877 private nurseries producing at a national level by the farmers. At the end of 2007-08, the world output of fruits and vegetables have crossed 4,763 and 6,992 lakh metric tonnes. However, the major area under fruit crops is noticed in the state of Maharashtra, Andhra Pradesh and Karnataka, which together contribute nearly 34 per cent of the national area. In the 2001-2002 EXIM Policy, the Union Government had allowed the State Governments to identify product specific agriculture export zones for end to end development to promote their cultivation for export in geographically concentrated areas. In Himachal Pradesh, the area under fruits had increased at a rate of about 6300 to 7500 hectares under the Tenth Plan bringing 3400 hectare of additional land under fruits. The state government wants to promote the cultivation of citrus, mango, kiwi strawberry, grapes etc., as the market for apples has started stagnating in the country. Apples still accounted for 89 per cent of the fruits produced in the states. The dried and preserved vegetables ranked the highest in the export basket of processed fruits and vegetables. U.A.E. is the main market for India’s dried and preserved vegetables and mango pulp. Whereas U.S.A. is the most important market for pickles and chutney, mushroom and other processed products.

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Diversification of Crop Sector in North Eastern Hilly (NEH) Region:
Micro Evidence from Meghalaya

V.T. Raju, S.M. Feroze and Ram Singh*

The paper, relying upon the secondary data available, attempts to find out the contribution of different crops in the overall growth of the crop sector in Meghalaya. For the purpose the study has worked out the compound annual growth rates, trends, Simpson Diversity Index (SID) to arrive at a logical conclusion. It is found that the shares of cereals and vegetables in total acreage have declined in between TE ending 1998-99 and TE 2004-05. Reverse trends were observed in case of high value crops such as spices and arecanut during the same period in the state. The values of SID have remained around 0.5 over the last decade implying the presence of diversification. The state has moved towards a greater diversification during the last decade as the value SID has increased over the years. The share of cereals in the overall growth of crop sector was maximum (65.53 per cent), followed by high value crops such as spices, arecanut and pulses. Cereals and vegetables have registered a negative growth in last decade whereas spices, oilseeds and arecanut have registered a positive growth in the case of acreage and total production which is a clear indication of moving towards diversity. High price volatility and instability involved with vegetables compared to cereals may be the reason for reduction in the area. To speed-up the process of agricultural diversification the government needs to take a series of reform measures to integrate production and markets efficiently. Contract farming, cooperatives and group actions may help small holders in augmenting their farm income through aversion of risk and uncertainty.

Marketing of Sweet Orange (Malta) in Kumaon Region of Uttarakhand

Divya Pandey†, Anil Kumar‡ and Rakesh Singh†

An attempt has been made to study the marketing of sweet orange in Almora district of Kumaon region in Uttarakhand. Primary data was collected from various stakeholders who constituted forty growers and five intermediaries operating at each level of the marketing channels. Six distribution channels were identified in the study area. More than 57 per cent of the produce was sold directly to the village trader. Marketing costs varied from Rs.278 per quintal to Rs. 894.16 per quintal in

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channel I. A major component of the marketing costs of the producer was costs incurred on mules, i.e., Rs. 150 per quintal. The producers were earning a 100 per cent margin in channel I and channel II. The producer’s share in the consumer’s rupee was 9.38 per cent in channel II followed by 8.60 per cent in channel I. Channel IV was the most efficient channel with an efficiency of 1.27. Channel VI was least efficient with an efficiency of 1.00. The producers are getting only 9 per cent of the consumer’s price in the case of the sweet orange. The spatial price difference between the local market and distant market is very wide i.e. more than Rs. 2000 per quintal. The study indicates that the marketing problems of the hilly areas are different from the other regions of the country. The main component of the cost of producers is the labour cost and transportation cost borne by the producers (cost on mules and jeep). The farmers of the hilly areas must be properly linked to the market for remunerative prices, through better roads and other infrastructure. Keeping in view the very high price spread and low producers’ share, there is a need to form the active marketing self-help groups which can take advantage of the distant and competitive markets and members will be benefited by remunerative prices. The other way to link farmers with the markets is through co-operative federations. To reduce the spatial differences in the price of produce, better transport and storage facilities are also required. Besides realising remunerative prices to the producers, it will narrow down the spatial price differences and both consumers and producers will be benefited.

A Study on Market Infrastructure for Promoting Agricultural Production and Prosperity of Hill Cultivators in Uttarakhand State

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An attempt has been made in this paper to examine the existing marketing infrastructure of hill farmers, its performance, limitations and suggestions for improvement for promoting the infrastructure of the market. The present study indicates that the Uttarakhand State should develop the market infrastructure in terms of orderly marketing. There is no ignoring the fact that the marketing infrastructure has undergone a continuous improvement in the Uttarakhand State over the years. This has induced a significant growth of 3 to 4 per cent in the production and marketing of a variety of fruits and vegetables. However, the marketing system for food grain commodities remained almost sluggish and no major improvement has taken place despite evidence of a sizeable marketable surplus of food grains in the low and mid hills. The improvement of transportation and communication infrastructure has promoted an increased collection of marketable commodities even

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from the far flung areas. However, the pattern of development has not been uniform and in accordance with the expert of commercialisation is remote and tribal areas, harbouring a potential niche for fruits and vegetables and still facing transportation problems that need due consideration. There are nine principal regulated markets and 39 sub-yards. However, the size and structure of these markets have not undergone major changes over the years and some of the market yards received low arrivals due to the inherent inefficiencies in handling and disposal. Therefore, there is a need to upgrade the principal markets through mechanisation and modernising their operations to create desirable horizontal and vertical integrations at various levels. The new market yards should be developed in focal producing hubs instead of “Mid way” market yards to attract more sold with in the state markets. The co-operative marketing societies should be revitalised by including professionalism and skilled management to increase their stake in the marketing of agricultural commodities besides the distribution of inputs. The success stories of well known co-operatives in the state as well as in other states should be emulated to revamp the co-operative marketing structure. There is a need to strengthen the State Marketing Board and to make it fully autonomous and financially sound as in the neighbouring states of Uttar Pradesh and Madhya Pradesh. The market committees should change the focus from collectors to promoters and take a keen interest in orderly marketing by creating desirable amenities and awareness about grading, packing and quality control. The committees should maintain reliable databases on prices, arrivals, commission charges, exports etc. and disseminate reliable information to create market intelligence among the producers. Over and above and most important, the maximum quantity and most superior quality of fruits and vegetables in the Uttarakhand state is produced in the Nainital and Almora districts.

**Crop Diversification an Effective Tool for Agricultural Development for Hill Region of Maharashtra State**

D.B. Yadav, H.R. Shinde and B.V. Pagire†

In the paper an attempt is made with the objective to study the extent and determinants of the diversification in the hill region, i.e., Konkan region of Maharashtra state. The study is based on secondary published data collected during the years 1960-61 to 2008-09 and various statistical tools, viz., Herfindhal and Entropy indices, multiple regression analysis were employed. The study revealed that the share of gross cropped area in the total geographical area is just around 30 per cent in the Konkan region whereas land under non-agricultural use increased more than 526 per cent during the period under study in the Konkan region. The cropping pattern of the Konkan region has diversified over the period. The share of mango and

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cashewnut in the area under total fruit crops, increased steadily in the region. Diversification indices for all crops, oilseeds and vegetables increased over the period. However, the magnitudes of diversification decreased for cereals, pulses and fruits indicating the intensification of high value crops, viz., paddy, gram, mango and cashewnut in the respective crop groups. The results of regression analysis emphasised the need of provision assured irrigation facilities in the region. Fruits and vegetables are the major contributors followed by fodder and cereals in the gross value added in the agriculture of the region. The per capita income of the Konkan region increased by 153.36 per cent during the last 10 years which can be attributed to crop diversification towards high value crops in the region.

Agricultural Development in North-Eastern Hilly Region of India: Problems and Prospects

S.S. Kalamkar*

An attempt has been made in this paper to study the problems and prospects of agricultural development in the North-Eastern hilly region of India. The North Eastern region/states are among the most backward in the country and agricultural development is much below its potential in this region. The economy of the north-eastern state is mainly rural and agrarian. Agriculture is the main occupation and despite the major impact of the Green Revolution in the irrigated areas of the country; the modernisation of agriculture has escaped this region as evidenced by poor adoption of modern technologies, low consumption of fertilisers and other indicators of growth. The agricultural production system in the region is predominantly rainfed, mono-cropped at the subsistence level. Pressure on rural land, hilly terrain, tribal population, economic backwardness of the area, low technological levels, low productivity coupled with low per capita income are the major features of this area. The cropping pattern in the region, with the exception of Sikkim, is characterised by the predominance of rice as the lead crop, however, maize is the dominant crop in Sikkim. The NE region continues to be a net importer of foodgrains even for its own consumption. The cropping pattern suggests the known tendency of concentrate in the foodgrains with rice as a food crop, mainly driven by the urge for subsistence. The net irrigated area in the region does not constitute a significant proportion of net sown area due to which irrigation coverage is also very low. Fertiliser consumption in the region is very low and spread of HYVs has been very poor against the national average. Productivity of almost all the crops is lower than that of the national level. The wide range of disparities among the states, the lack of location-specific and system-based technologies, limited availability of cultivable and farming technique bordering between primitive and traditional are the major reasons behind the slow

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pace of agricultural development of the NE region. Therefore, a promotional measure for high-yielding variety seed, fertiliser use is required in these areas. At the same time, efforts need to be made for location-specific research with more emphasis on agricultural extension services. The North-Eastern Region of India has a high potential to tap immense opportunities emerging in the high-value sector provided the existing constraints are alleviated through appropriate policies and institutional arrangements.

Rearing of Migratory Sheep as a Livelihood and Food Security in Hill Economy: A Case Study of Kangra District of Himachal Pradesh

Sushila Kaul, D.R. Singh, Rajender Singh and Arbind Kumar†

An attempt is made to study the income, employment and status of food security of the households rearing migratory sheep in Kangra district of Himachal Pradesh. For the purpose the data pertaining to the employment status, nature of employment, income of family members and hired labour were collected from 13 farmers during the year 2004. It was observed that the rearing of migratory sheep and goat provides good employment opportunities in Himachal Pradesh. The employment status of the migratory sheep farmers by this enterprise was for 1098 man days per annum on small and 1307 man days per annum on large farms. The income over input costs from sheep in case of small flocks was Rs.233 per sheep and Rs. 242 on large farms. The per farm net income over input costs was around Rs.1,62,000. The consumption of the food pattern clearly indicates that rice, wheat and maize are the main items of cereals consumed and the average consumption of total cereals worked out to 4.38 kg per person per month. Among the pulses, gram, urd and moong were consumed and the entire quantity of pulses consumed was purchased from the market. More than 5 kg of vegetables were consumed by the farmers per person per month. More than 2 kg per person per month was the consumption of fruits by the farmers of small as well as large farms. More than half of the total vegetable consumption was home grown, On the other hand, all the fruits consumed were purchased from the market. Consumption of meat varied from 0.30 kg to 0.37 kg per person per month and almost 70 to 80 per cent of the meat consumed was home produced. The consumption of milk was more than 12 kg per person per month. Almost all the milk consumed was home produced while the other commodities like edible oils and sugar were purchased from the market. The status of food security was judged by the actual consumption of food, compared to the norms recommended by the National Institute of Nutrition (NIN), Hyderabad. The deficit or surplus was calculated on the basis of the items of food consumed per person per month against the dietary norms recommended by the NIN. The comparison indicated that the consumption of cereals,

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milk, sugar and fat and oils was more than the quantity required by all categories of farmers. Consumption of pulses and meat, vegetables and fruits was substantially lower than the required norms.

**Land-Based Economy of Cold-Arid North-West Himalaya of Ladakh**

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The paper examines the important components of the land-based economy of Ladakh, its issues, options and strengths for development of this sector. The analysis based on primary and secondary data, collected from 150 households of block Leh in the cold arid Ladakh spread over six villages revealed that soil in the study area is sandy, skeletal, celestius, fridged and are classified as high altitude desert soils, grouped as typical cryonths. The soil in general is low in nitrogen, moderate in phosphorus and high in potassium content. These soils are also low in zinc, iron but it contains sufficient copper and manganese to support crop production. The economy of Ladakh is primarily livestock-oriented with a logistic support of the agriculture sector in the ratio 60:40 respectively. Agriculture is characterised by subsistence farming which is a prominent feature in the cold arid areas. Natural endowments divide the cold arid zone of Ladakh into three agricultural zones viz., upper agricultural zone (UAZ) central agricultural zone (CAZ) and lower agricultural zone (LAZ) wheat and barley/grim/millets are the most important cereals that account for nearly 65 per cent of the net sown area in *kharif* and alfalfa as important fodder crops. The average livestock number per household was 17 in Ladakh and was the highest with 83 animals per household in the breeding tract of pashmina goats. Local cattle and Yak/demo turned to be most important livestock species (excluding small ruminants) which accounted for 19.63 per cent of the total livestock. The general observation in that region is rich/famous for small ruminants and comprised of more than 85 per cent of livestock population. Small ruminants rearing not only generated income for livelihood under the harsh climatic conditions but also provided nutritional security through producing nutritional food (milk and meat). Overall it could be concluded that the cross bred cow and small ruminants in livestock; wheat in field crops and apricot, potato besides other vegetables in horticultural produce could, serve long-term sustainability to the promising enterprises in the region.

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Relevance of Indigenous Farming System (Zabo System) for Sustainable Agricultural Development in Hill Agriculture – A Case Study of Phek District of Nagaland

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A study was undertaken on the Zabo System which is practiced by the Chakaseang tribes in the Phek district of Nagaland and compared with the most popular farming system known as shifting cultivation which is largely practiced in the NEH Region. The Zabo-System is a unique system. Success of this system is mainly guided by demand driven forces as its location comes under the rain-shadow zone. The practices of cultivation are now called “Zabo” meaning the impounding of water”. The system includes well planned water harvesting tanks in the middle of the individual field and the run of water from the upper catchment area taken directly to the field to grow paddy crops and for the rearing of fish. Soil fertility is maintained by growing azolla and incorporating legumes/leaves crops in the paddy field which is available in the nearby forest. Cattle sheds are also made on the top of the water tank/terrace and cowdung, urine is directly diverted to the field using the available resources and skill. The forest is self intact, no deforestation is being allowed in the catchment area. The study reveals due to the adoption of the system by many farmers, the area under the jhum cultivation in the village decreased from 857.43 to 364.20 ha during the 1981 – 2001-2005 period. The Zabo-System also addresses the problem of water scarcity and its optimum utilisation through different land management activities. Only external inputs are used to grow the crops as well as vegetables and fish. The productivity of crops in the system is higher, ranging between 15-20 per cent in comparison to the shifting cultivation and the farmers are also better off with respect to the nutritional status. Majority of the farmers are self sufficient (90 per cent) in rice whereas the farmers practicing the Shifting Cultivation have the deficiency of rice requirement. The system is equitable in comparison to shifting cultivation since the Gini coefficient is higher in the zabo-system. The system is more economically viable and feasible; IRR and NPV are only 13 per cent and Rs. 3,266 only. It may be further increased through the integration of the new technology especially with the introduction of new high-yielding varieties of rice and new species of fish. In addition, there is ample scope to increase the cropping intensity system by integrating new crops with the introduction of short duration varieties since the availability of water is being ensured through the harvesting of rain water as well as preserving and optimisation of the water used through the local techniques, which is considered as the unique system for the conservation of natural resources for sustainable agricultural development in the hilly areas, this system can

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be the potential system for organic production since the farmers are not using external inputs and maintaining the fertility and supply nutrients to their crops through the recycling of biomass. The standardisation of the practice of organic production for this area will provide the additional encouragement to the farmers to get the premium price for their produce without much investment. The zabo system may be looked at as a complete system since it possesses all the criteria of the sustainable agricultural development as well as is able to meet the immediate challenges of food security and household nutritional security without sacrificing the natural resources which is the basic need of hill agriculture. There is also an urgent need to popularise the system through appropriate incentive and policy matters otherwise the system will only be confined to the area where it has been developed with the wisdom of the local farmers. This system can be included in the integrated watershed programme which is being implemented by all State Governments of the NEH region.

**Impact of Male Migration on the Participation of Females in Farming Systems of Himachal Pradesh**

Meenakshi Sharma*

The paper attempts to examine the extent of male and female participation in agriculture and other related activities in the presence of male migration in Himachal Pradesh. The study relied on secondary sources of information. It was observed that the female participation is relatively higher in animal husbandry followed by household works and in cultivation of various crops on the farm. The work load is more in the vegetable based farming and less in the fruit based farming system in Himachal Pradesh. Overall, a female labourer works two times more than her male counterpart in agricultural and household activities which could be attributed to the migration of men outside the villages in search of job opportunities.

**Changes in Hill Agriculture Sector – Problems and Remedies: A Case of Himachal Pradesh**

M.S. Pathania†

A study was conducted in Nagrota block of Kangra district to examine the strengths and weaknesses of agriculture in Himachal Pradesh by analysing the growth and performance of different components over the years. The study is based on secondary and primary data. Multistage random sampling technique was adopted and a sample of 40 farmers were selected from three villages randomly selected from the

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block. The findings of the study have clearly indicated that the population in Himachal Pradesh has increased over the years. The decrease in the growth rate of human population along with a reduction in poverty have resulted in a spurt in the demand for foodgrains as well as quality food. The education status of both males and females have increased over the period under study. Per capita income increased sharply showing an increase of 4,408 per cent over time. The study clearly brought out that the large holdings have decreased, while small and marginal holdings increased over the years in the state resulting in higher human labour pressures on agriculture. The increasing trend calls for not only a reduction in the increased population dependent on agriculture not only to move from subsistence to the sustainable level but also to withdraw the population from agriculture by opening up alternative employment opportunities. There has been a slight change in the area and productivity of foodgrains, vegetables and fruit crops over the years. The production and productivity of maize, wheat, paddy and vegetable crops have increased while pulses registered a declining trend. The total area under irrigated crops accounted for only 18 per cent. This shows that the development of agriculture has reached a stage where more reliance has to be placed on rainfed farming for food security. There existed a higher gap between and actual and potential productivity of the crops. Hence there is a great need to increase the productivity of crops as there is very little scope for area expansion. The farmers will have to adopt subsidiary income generating activities like bee keeping, mushroom farming, off-season vegetables etc., for augmenting their income. The findings of the sample survey are in conformity with the results obtained at the state level. In the absence of a limited scope for increasing agricultural production through the expansion of area, diversification of agriculture: enhancement of productivity and environmental safety need to be the main thrust areas. The transfer of technology for improved crop productivity needs to be taken up on a priority basis.

Economic Analysis of Saffron Cultivation in Jammu and Kashmir

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The present study was undertaken to work out the economics of saffron cultivation in Jammu and Kashmir. The research methodology consisted of a four stage stratified sampling procedure wherein Pampore Tahsil of the Pulwama district of Jammu and Kashmir was selected purposively. A random sample of 175 saffron growers, comprising 75 small, 60 medium and 40 large category growers, was chosen from the 7 randomly selected villages of the selected tehsil. The data was collected through personal interviews with the help of specific and pre-tested schedules. The study pertained to the crop cycle of 10 years and related to the agricultural year 2003-
04. The findings of the study revealed that the per hectare cost of saffron cultivation was higher during the initial year of establishment in all the three categories of growers. The economic analysis in terms of cost and returns, net present value, benefit-cost ratio, pay-back period, internal rate of return and the farm profit measures indicated that the crop is economically viable. Overall, the study indicated that the saffron crop is highly remunerative and offers ample scope for employment generation. There is much scope for making this crop more profitable provided sincere efforts are made by providing quality planting materials, introduction of sprinkler irrigation system, pest and disease resistance measures and efficient marketing system to expand the area as well as production in the state.