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ABSTRACTS OF M.Sc. THESES

Sharma, Umesh Kumar. 1988. Dynamics of Land Use in Different States of India. G.B. Pant University of Agriculture and Technology, Pantnagar. *Major Advisor* : V.K. Pandey.

The study was carried out to examine the changes in land use pattern, the trend and growth rates in different land use classes and the dynamics of land use shifts among different classes in different states of the country. Spearman's rank correlation coefficients were calculated to examine the overall changes in land use pattern. Linear and log-linear forms of time trend equations were estimated to calculate the growth rates and annual rate of change among different land use classes in different states. The dynamics of land shifts in different states was analysed through a simple but exquisite model based upon linear additive identities of annual rates of change. Time series data of the nine standard land use classes for the period from 1966-67 to 1983-84 was used in the study.

The study revealed that overall land use pattern more or less has remained the same in different states, except for a few periodical changes in some states. However, time trend growth rate analysis showed that there were significant changes in various land use classes in different states as well as country as a whole. Some favourable trends are observed such as a substantial increase (over 10 th. ha. per annum) in forest area in the states of Gujarat, Karnataka, Orissa and Rajasthan, a substantial decline (over 10 th. ha. per annum) in barren and usar land in the states of Assam, Bihar, Gujarat, Himachal Pradesh, Mizoram, Orissa, Punjab, Rajasthan, Tamil Nadu and Uttar Pradesh and a substantial increase in net cultivated area in the States of Assam, Haryana, Karnataka, Madhya Pradesh, Punjab, and Rajasthan. Contrary to these, some unfavourable trends are also observed such as substantial decline in forest area in the states of Himachal Pradesh and Nagaland, a substantial increase in barren and usar land in the states of Haryana, Maharashtra and Tripura, a substantial increase in fallow and/or waste lands in Gujarat, Mizoram and Tamil Nadu and a substantial decline in net cultivated area in the state of Tamil Nadu and Uttar Pradesh.

The dynamics of land use shifts indicated a substantial amount of shifts in a large number of states as well as at the country level from both

the desirable ecology sector comprising forest, permanent pastures and miscellaneous trees crops as well as the undesirable ecology sector comprising barren and usar land to agriculture as well as non-agriculture sectors. These shifts from desirable ecological sector have adverse implications, while the shift from undesirable ecological sector have favourable implications towards ecological balance. The net transfers of land from agricultural sector to non-agricultural sector and the land transfer from net sown area to fallows and waste lands within agricultural sector as observed in some states and at the country level, have serious adverse implication towards agricultural growth and ecological balance.

Jha, Brajesh Kumar. 1989. An Evaluation of Cattle Insurance Programme in Burdwan District of West Bengal. G.B. Pant University of Agriculture and Technology, Pantnagar. *Major Advisor* : B. Prasad.

Cattle insurance protects the farmers against the mortality or morbidity losses of cattle and also facilitate their credit worthiness in receiving loans from the lending agencies. Since the introduction of cattle insurance in 1974, hardly any evaluation has been done. It is in this context that the present study was undertaken in the Asansol block of district Burdwan (W.B.) with specific objectives of finding the economics of cattle insurance programme, studying the nature and degree of risk in different cattle classes, and examining the constraints faced by the cattle insurers and the insurance agencies.

Degree of risk was measured through standard deviation and coefficient of variation of per cent indemnity ratio from the time series containing annual variation in indemnity per unit of premium. To get the nature of risk, linear, log linear and quadratic equations were tried in per cent indemnity ratio. Again linear and log linear trend equations have been estimated to find the growth rate of the programme.

Premium accounts for only 45 and 35 per cent of total cost in General (non-IRDP) and I.R.D.P. insurers, respectively. The B.C. ratio was more than 1 in I.R.D.P. insurers but less than 1 in General (non-IRDP) categories of insurers.

Three distinct classes of cattle were found on the basis of mean and coefficient of variation of percentage indemnity ratio—milch cattle, heifers including calves and male cattle. In the same class of cattle mean and coefficient of variation of indemnity ratio were more in I.R.D.P. animals than General animals.

The main problem faced by the insurance agencies are lack of fool

proof system of identification and lack of standardized valuation table for correct assessment of the value of animals.

Joshi, R.M. 1990. Economics of Production and Marketing of Arecanut in Raigad District (Maharashtra State). Konkan Krishi Vidyapeeth, Dapoli, *Major Advisor* : G.G. Thakare.

Arecanut is one of the important cash crops of India (and is an important article of trade). The major arecanut growing States in India are Karnataka, Kerala and Assam which accounted for about 90 per cent of the total area under this crop and 91 per cent of production.

In Maharashtra, arecanut is mainly cultivated in the districts of Raigad, Ratnagiri and Sindhudurg. Total area under arecanut in Maharashtra is 1800 hectares. Out of this, 600 hectares is in Raigad district. Considering importance of arecanut as a cash crop in the Raigad district, the Raigad district was selected purposively for the present study, which is famous for an arecanut variety "Shrivardhan Rotha." At present very little information is available regarding economics of production and marketing of arecanut in this district. Therefore, a study on economics of production and marketing of arecanut in Raigad district is undertaken to estimate the cost of production, to study the economics of intercrops/mixed crops, to identify the different marketing channels and to study the marketing costs, market margin and price spread.

The sample consisted of 90 arecanut growers randomly selected from Srivardhan, Murud and Alibag *tahsils* of Raigad district. On the basis of size, arecanut orchards were classified into small (0.22 ha.), medium (0.58 ha.) and large (1.10 ha.) size groups. The major quantity of arecanut in Raigad district is marketed through village merchants and Supari Kharedi Vikri Sangh. Therefore, 7 village merchants, Supari Kharedi Vikri Sangh, four commission agents and five retailers from Bombay were also selected for the present study. The information for the year 1989 was collected from arecanut growers as well as market intermediaries. To work out the maintenance cost, the standard cost concepts were used. The lagged margin method was used in studying the price spread.

The average size of arecanut orchard was 0.42 hectares. Maximum number of sample cultivators (63.33 per cent) belonged to small group followed by medium (24.45 per cent) and large (12.22 per cent) size groups.

The average number of arecanut plants per hectare was 1515. The percentage of bearing plants was 71.04. Among mixed crops, coconut was prominent with sizeable number of trees (184 palms/ha.)

Per hectare total labour required for maintenance of arecanut orchard was 606.91 mandays. The labour requirement decreased with an increase in the size of orchard.

Per hectare total cost of maintenance of mixed orchard (Cost-C) worked out to Rs. 36444.26. Per hectare maintenance cost decreased with an increase in size of orchard.

Per hectare total returns from main crop and mixed crop was maximum in small size orchard (Rs. 58963.22) followed by medium (Rs. 54932.60) and large size orchard (Rs. 50248.34).

The net returns at cost 'C' were Rs. 18327.82. Net returns were found to be inversely related with the size of orchard. This indicated that small size orchards are more profitable. The cost benefit ratio was 1.50.

Per farm production of arecanut was 481.73 kg. Out of this, the marketable surplus was 98.47 per cent. It was observed that arecanut growers sold their marketable surplus through four agencies, self marketed by growers directly to consumer, Supari Kharedi Vikri Sangh, village merchant (dried nut) and village merchant (undried nut).

It was observed that the commodity passed five different channels of trade, namely.

- (i) Producer—consumer (direct sale).
- (ii) Producer—Supari Kharedi Vikri Sangh—commission agent cum wholesaler—retailers—consumer.
- (iii) Producer—Supari Kharedi Vikri Sangh—consumer.
- (iv) Producer—village merchant (dried nuts)—commission agent cum wholesaler—retailers—consumer.
- (v) Producer—village merchant (undried nuts)—commission agent cum wholesaler—retailers—consumer.

It is observed that the per quintal price of dried husk nut received by the producer was Rs. 3426.47 in Channel-I which was maximum as compared to other channels. The net price received by the producers was maximum in Channel I (95.44 per cent) followed by Channel III (86.89 per cent), channel II (73.33 per cent), Channel IV (63.14 per cent) and Channel V (53.78 per cent).

The Channels I and III were most efficient. However, the quantity passed through these channels was negligible and hence producers should resort to channel II in order to get better price.

Katre, R.S. 1990. Variability in the Prices of Paddy in Maharashtra State. Konkan Krishi Vidyapeeth, Dapoli. *Major Advisor* : R.P. Thakare.

Paddy is one of the important foodgrain crops grown in India as well as in Maharashtra State. The production and productivity of paddy are fluctuating over the years. The year to year fluctuations in production gives rise to large fluctuations in paddy prices. Besides, annual variations in production and low price elasticity of demand, other contributory factor to the instability of paddy prices is the seasonality of paddy production. Wide fluctuations are observed in the prices and arrivals of paddy in different paddy producing regions of Maharashtra State. Therefore, the present study was conducted to

- (i) study the variability of paddy prices in important markets of paddy producing tracts of the Maharashtra State,
- (ii) study the trends in the prices and arrivals of paddy in selected markets of Maharashtra State,
- (iii) study the correlation between prices and arrivals of paddy,
- (iv) examine seasonal fluctuations in prices and arrivals of paddy in the selected markets, and
- (v) study the extent of integration of paddy markets in Maharashtra State.

Seven regulated paddy markets namely, Pen and Murbad from Konkan region, Nashik and Ghoti from Nashik region, Gondia, Tumsar and Armori markets from Vidarbha region were selected on the basis of maximum annual paddy arrivals in these markets. Data on monthly arrivals and prices of paddy for the period of about 15 years (1974-75 to 1988-89) in these markets were obtained from the records of A.P.M.C. of the respective paddy markets. Instability in prices and arrivals were studied by estimating coefficient of variation to respective series. Linear association, functional relationship and time series analysis were also calculated.

The results of the study indicated that the variability in annual weighted price of paddy was maximum in markets of Nashik region, followed by markets of Vidarbha and Konkan region, indicating

non-consistency in the price received by average producer in the markets of Nashik region. The months of maximum and minimum variability in paddy arrivals were different for different markets and were not related directly or inversely with the months of maximum and minimum variability in paddy prices. During the study period of 1974-75 to 1988-89, the paddy prices were fluctuating most during the years of 1979-80 to 1982-83. In short-term, the monthly paddy prices and paddy arrivals were most inconsistent in markets of Nashik region as compared to paddy markets of other region. The long-term monthly prices and arrivals of paddy were inversely correlated with each other.

The functional relationship between long-term monthly prices and arrivals revealed a maximum and statistically significant decrease of 0.12 per cent in paddy prices with 1.00 per cent increase in monthly arrivals in Pen, Tumsar and Armori markets. The correlation between monthly paddy prices and arrivals for the year 1988-89 (in short-term), was negative and statistically significant in Ghoti, Tumsar, Gondia and Armori market. In the functional relationship between monthly prices and arrivals for the year 1988-89, Ghoti, Tumsar, Gondia and Armori markets indicated 0.04, to 0.09 per cent decrease in monthly prices with unit per cent increase in monthly arrivals.

The relative prices received by producers of Nashik region were highest followed by producers of Vidarbha region and producers of Konkan region when compared with price received by average cereal producer at all India level.

During the period of 1980-81 to 1988-89, the paddy prices increased at maximum rate of Rs. 19.52 per quintal per year in Nashik market and minimum of Rs. 7.72 per quintal per year in Pen market, whereas, the maximum increase in annual arrivals was witnessed in the Gondia market and minimum in Ghoti market. The negative arrival trend was observed at Murbad and Nashik markets.

The seasonal indices of paddy prices were minimum during August to December in all the selected markets, indicating lower price level of paddy two months before and after the harvest period of paddy. The seasonal indices of paddy prices indicated an increasing trend during January to August on account of lean periods of arrivals. The seasonal indices of paddy arrivals were increasing during the months of November to March in markets of Konkan region, during September to December in markets of Nashik region and during October to February in markets of Vidarbha region, indicating the regionwise period of peak arrivals of paddy.

Correlation between monthly paddy prices in long-term indicated, that the markets of Konkan and Vidarbha region are strongly and about perfectly integrated, whereas markets of Nashik region were not integrated with markets of Vidarbha and Konkan region. This may be due to the differences in the months of peak and lean arrivals and consequently the months of lean and peak prices in Nashik market as compared to paddy markets of other two regions. The correlation between average annual prices in selected markets and between weighted annual prices during post-harvest season in selected markets revealed a strong and perfect market integration between all the selected markets as well as between paddy markets of selected regions.

Malave, D.B. 1990. Economics of Package of Practices of Alphonso Mango Cultivation in Sindhudurg District. Konkan Krishi Vidya-peeth, Dapoli. *Major Advisor* : G.G. Thakare.

Mango is an important cash crop of the Konkan region and has vital importance in the economy of Konkan. Alphonso, the famous mango variety, is grown in Sindhudurg district accounting more than 90 per cent of the area under mango in the district. This mango is known in the country and abroad for its excellent taste, colour, shape and keeping quality. It fetches very good price in the country and international markets. It has become important source of earning foreign exchange. In view of this, it is imperative to identify different package of practices of Alphonso mango cultivation and to work out costs and returns from each practice and to estimate resource use efficiency and gap in yield due to different package of practices.

For selection of mango orchards, three stage sampling technique was followed with *tahsil* as primary unit, village as secondary unit and mango growers as ultimate unit. Three *tahsils* namely Deogad, Vengurla and Sawantwadi were selected purposively from Sindhudurg district as area under Alphonso is high in these *tahsils*. Ten mango growers having bearing mango orchard were selected randomly from each villages. Final sample consisted of 90 growers. Analysis was carried out in respect of 64 sample growers.

Most of the mango growers follow recommended doses (140 N, 50 P, 57 K) of chemical fertilizers as well as at least three sprays of plant protection chemicals. Among the different package of practices, the application of manures and fertilizers in the month of June, FYM upto 30 qtls, N 100-150 kg., P_2O_5 upto 30 kg. and K_2O upto 50 kg. resulted

in highest yield and lowest per crate cost. This indicated the proper time and right quantity of these inputs. For economic yield at least three sprayings/dustings of plant protection chemicals are necessary. Use of growth promotors and three sprayings/dustings have beneficial effect on yield of Alphonso mango.

The overall per hectare cost of cultivation came to Rs. 13,631.70 and Rs. 5802.14 was marketing cost. Out of total cost of production, 17.64 per cent (Rs. 3429.10/ha) was incurred on human labour, 7.85 per cent was on manures and fertilizers, and 5.19 per cent on plant protection. The marketing cost was the highest (25.86 per cent) indicating marketing of mango is expensive. The cost benefit ratio in bearing mango orchards was more than unity (1.58) indicating that cultivation of mango is profitable.

The functional analysis indicated that number of sprayings/dustings, hired labour and size of orchard have positive contribution in productivity whereas age of orchard and number of trees have negative effect on productivity of Alphonso mango.

Patil, M.M. 1990. Study of Working of Comprehensive Crop Insurance Scheme in Raigad District. Konkan Krishi Vidyapeeth, Dapoli.
Major Advisor : S.G. Borude.

The business of farming involves numerous risks-natural, social and human. Agriculture is liable to heavy losses through natural uncertain calamities which are beyond man's control. Uncertainty of crop yield is thus one of the basic risks which every farmer has to face. In a country like India, majority of farmers are poor and therefore, unable to bear risks.

The best means of transferring the risks in agriculture arising from natural calamities is crop insurance. Crop insurance is a device through which the uncertainty faced by an individual is transferred to an agency or insurer through their participation in large number for which they pay premium i.e. the total risk is shared by all the participating farmers.

Raigad the major rice growing district in Maharashtra State was selected purposively and four *tahsils* in this district were selected randomly. One *tahsil* i.e. Alibag along the sea coast and three *tahsils* i.e. Panvel, Roha and Poladpur away from the sea coast, were selected. Tahsilwise data on per hectare yields of rice for the last twelve years were collected to study yield variability, to determine guarantee level yields (or threshold yields), to estimate losses in yield and to deter-

mine premium rates for each *tahsil*. Data about *paisewari* was required to study inter village variation in a crop situation. The data regarding actual operation of Comprehensive Crop Insurance Scheme were collected for evaluation of the existing scheme and comparing it with the results of the present study.

Among *tahsils*, the average rice yield was maximum in Alibag *tahsil* (2283 kg/ha) and minimum in Mhasala *tahsil* (1315 kg/ha). The coefficient of variation in yield was highest in Khalapur *tahsil* (32%) and the lowest in Alibag *tahsil* (11.7%). This wide variation shows that the district is not a suitable unit of insurance and if it is made, the insurance scheme will be less attractive due to low insurance coverage and low compensation. Instead, *tahsil* could be a suitable unit for insurance and will have separate insurance coverage and premium rate. The indemnity can be paid by taking village as a unit and *paisewari* can be used to assess village to village losses. If the *paisewari* is below the level of guaranteed yield, the village will be entitled for indemnity. The villages having same *Paisewari* can be grouped together and uniform indemnity can be paid to each villages in the group. Different groups of villages will get different compensation depending upon the extent of loss.

When the actual operation of Comprehensive Crop Insurance Scheme was studied, it was seen that the tendency among the farmers to borrow crop loan is very low and hence, the proportion of borrowing cultivators and amount borrowed per cultivator is very low. Consequently, the benefit of crop insurance has remained very much restricted to only 10 to 12 per cent cultivators. Hence, the purpose of protecting farmers from natural hazards is not fully served. The extent of protection provided to participating farmers is also very small and in attractive. It is, therefore, suggested to make crop insurance "applicable" to all the cultivators compulsorily and provide protection by guaranteeing 80-90 per cent yield in different *tahsils* according to the degree of risk. The premium should be fixed on the basis of annual average loss which will be not more than five per cent of the annual average yield so as to keep it within the paying capacity of the cultivators.

Jadhav, K.L. 1991. Economics of Production of Summer Groundnut in Sindhudurg District. Konkan Krishi Vidyapeeth, Dapoli. *Major Advisor* : G.G. Thakare.

Groundnut is the dominant oilseed crop in India as well as in Maharashtra. It plays very important role in Indian diet. India was net exporter of oilseeds till 1960. The current domestic production of edible

oil is far short of demand. To keep the prices at reasonable level and meet the demand, edible oil requires to be imported. The demand for vegetable oils is expected to rise in coming years due to rising population and improvement in income. It is therefore, necessary to increase productivity of groundnut crops. Considering importance of oilseed crops in national priorities and their high market prices, the farmers from the Konkan region are motivated to take up this crop due to which area under this crop is constantly increasing. However, at present, no systematic information on costs and benefits is available. Considering the importance of the crop in the area, the study was undertaken in Sindhudurg district

- (i) to study trends in area, production and productivity of summer groundnut after its introduction in the study area,
- (ii) to study cost of production,
- (iii) to study resource productivity and,
- (iv) to assess constraints in increasing area under summer groundnut.

Data were collected from 90 cultivators of nine villages from three *tahsils* of Sindhudurg district for the 1989-90 crop season. For trend analysis, secondary data were obtained from "Epitome of Agriculture in Maharashtra". The data were analysed to estimate trends in area, production and productivity, costs and returns, functional relationship and constraints faced in cultivation and increasing area under this crop.

The results of the study revealed that Sindhudurg district has shown an increasing trend in area, production and productivity of summer groundnut. Groundnut was found to be highly labour intensive crop in Konkan region and provides proportionately higher employment to family labour especially to female labour. Per hectare cost of cultivation (Cost-C) worked out to Rs. 10,286.82. The share of Cost-A and Cost-B were Rs. 4989.52 (48.50%) and Rs. 7323.51 (71.19%), respectively. Per hectare yield obtained was 14.87 qtls. of dry pods and 32.87 qtls. of by-products. The total value of produce came to Rs. 12,013.66. Net returns at Cost-A, B and C worked out to Rs. 7024.14, Rs. 4690.15 and Rs. 1726.84, respectively. Per quintal cost was estimated at Rs. 628.46 with cost benefit ratio of 1.17. The classification of cultivators according to yield levels and corresponding input use indicated that higher per hectare yield was associated with higher per hectare quantities of inputs used namely, seed, FYM and phosphorus fertilizer.

As regards disposal of produce, it was observed that maximum quantity of produce (59.07%) was consumed at home by extracting oil. There was positive relationship between size of farm and quantity sold. The functional analysis showed that there is a scope to increase area under this crop as well as to increase quantities of seed and phosphorus fertilizer to get higher returns. There exists a scope to re-organise the resource use to increase the profit from the crop. The constraints as perceived by the cultivators in the cultivation of groundnut were mainly small size of holding, non-availability of bullock labour, seed, human labour, fertilizers, high costs of seed, fertilizers, lack of knowledge about type and dose of fertilizers and plant protection measures. The constraints experienced in increasing area under summer groundnut were inadequate availability of irrigation and labour supply during peak season and non-availability of good quality seeds. The reasons of low productivity experienced by farmers were damage to the crop by wild animals, low plant population, poor quality seeds, incidence of pests and diseases, inadequate plant protection measures, less fertility of soils, non-adoption of improved technology and lack of fertilizer use. Incidence of pests and disease was reported by 90 per cent of the farmers. The common pests and diseases reported were aphids, leaf miner, tikka, rust and wilt.

Kane, S.D. 1991. Economics of Preparation of Traditional Products of Mango and Kokam at Household Level in Ratnagiri District. Konkan Krishi Vidyapeeth, Dapoli *Major Advisor* : S G. Borude.

Mango and kokam are important crops of Konkan region and in rural households there is common practice of processing these products at household level. However, no information is available regarding the quantity processed, types of products prepared and their economics. Therefore, the study on "Economics of preparation of traditional products of mango and kokam at household level in Ratnagiri district" was undertaken (1) to identify different products of mango and kokam prepared at household level and quantum of production, (2) to work out economics of these different products, (3) to study the method of disposal of these products, and (4) to study the constraints-technical, financial, availability of raw material, etc. in the preparation of these products.

Dapoli and Khed *tahsils* were selected purposively and two villages from each *tahsil* were selected randomly. The data were analysed keeping in view the objectives of the study.

Four mango products viz., pickles, dried mango slices, mango leather and ambamavae and three kokam products viz., dried kokam, amrit kokam and kokam butter were prepared.

The results of the study revealed that the quantity of pickle prepared per household was 4.94 kg. The quantity of dried mango slices, mango leather and Ambamava prepared were 4.01, 5.64 and 6.94 kg., respectively. In case of kokam products the quantity prepared were 6.94 and 4.26 litres respectively for dried kokam and amrit kokam.

The cost of processing of one quintal of mango fruits into pickle was Rs. 2375.78. The net value added from processing was 88.67 per cent. The cost of processing one quintal of mango fruits into mango leather, muramba and amabamava worked out to Rs. 587.36, Rs. 2462.95 and Rs. 670.40, respectively. In case of dried kokam, the cost was Rs. 372.49 and in amrit kokam it was Rs. 557.75.

The average quantity mango leather sold per household was 2.88 kg. The corresponding quantity sold for ambamava, dried kokam ring, amrit kokam and kokam butter products were 0.45 kg, 2.7 kg, 1.63 litres and 1.6 kg., respectively. Average value realised per household was Rs. 133.30.

The proportion of mango and kokam products prepared was different from product to product. In case of mango products, more than 50 per cent households prepared pickle followed by dried mango slices (34.17%), mango leather (27.92%), muramba (23.75%) and Ambamava (8.75%). In case of kokam, dried kokam rind was a common product prepared by 40.83 per cent households followed by amrit kokam (26.67%). Good number of rural households prepare mango and kokam products but the preparation of mango products is more common than kokam products. Main aim of preparing these products is to meet family requirement. However, some families do sell small quantities to earn income to the family. Since home consumption is the main objective, the quantities prepared are small and they are prepared within a day.

Since the products are prepared for home consumption, the consideration of costs and returns is not important. Capital requirement is small. Generation of employment is also not the consideration. However, the analysis of costs and returns indicated that preparation of some of these products is quite profitable and they provide good employment.

Kap, B. V. 1991. Economics of Package of Practices in Rice Cultivation in Raigad District. Konkan Krishi Vidyapeeth, Dapoli. *Major Advisor* : S.G. Borude.

Rice is the staple food crop in the Konkan region and this crop plays an important role in the economy of Konkan. Rice crop occupies

an area of 4.66 lakh hectares in Konkan region and contributes about 30-33 per cent in the State's rice production. In recent times all efforts are concentrated on increasing per hectare yield of rice. They can be broadly grouped into two categories i.e. (i) use of physical inputs viz., HYV seeds, FYM, fertilizer, pesticides, etc. and (ii) adoption of agronomic practices or non-cash inputs, viz. time of sowing/transplanting, spacing and plant population, number of seedling per hill, age of seedling at transplanting, etc. Crop productivity increases when physical inputs and non-cash inputs are judiciously combined as per recommendations.

The farmers have adopted most of the practices, not fully but partially. The contribution of each practice to increased yield and its economics on cultivators' fields need to be worked out, so as to convince the farmers about the adoption of these practices. Therefore, the study was undertaken to study the practices followed by cultivator in the cultivation of rice to study the costs and returns from the practices adopted in rice cultivation, and to study the resource use efficiency of factor inputs used in rice cultivation.

Raigad district was selected purposively for the study as the area under rice is highest in this district. Data were collected by survey method from 135 cultivators from nine villages of three randomly selected *tahsils*. Multiple regression was used to study the relationship between different variables. In addition, Cobb-Douglas production function technique was also used to estimate the productivity of various factor inputs in rice cultivation.

The results of the study indicated that 80.96 per cent of rice area in the study region was under HYV. Farmers were using 80.87 kg. seeds per hectare which was more than recommended rate (37.5 kg/ha). The application of manures was 15.48 cart loads per hectare and fertilizer application was less than recommended. Nitrogen applied was 62.5 kg/ha, phosphorus 5.85 kg/ha and potash 5.85 kg/ha.

Per hectare cost of cultivation of rice was Rs. 8614.44 and gross returns worked out to Rs. 5761.16 and per hectare net returns were Rs. (—) 2852.83, net returns being negative. The benefit cost ratio was less than unity (0.67).

The human labour was found to be an important input in the cultivation of rice as the cost incurred on human labour was maximum (41.70%).

Among the physical inputs, fertilizer application resulted in the highest net returns of Rs. 1834.04 at input cost of Rs. 4301.33.

Among the different non-cash inputs, transplanting of rice in the

first week of July, age of seedling upto 25 days, 4-6 seedlings/hill resulted in higher yields.

The functional analysis indicated that area under rice and use of family labour had positive contribution in the productivity of rice. The MVP/FC (factor cost) ratios for area under rice, FYM and fertilizer were more than unity indicating the scope for expanding the use of these factors. This ratio was less than unity in case of seed used and human labour indicating that there is excess use of these inputs and they need to be curtailed.

Kerutagi, M.G. 1991. Production and Marketing of Silk Cocoons in Bijapur District, Karnataka—An Economic Analysis. University of Agricultural Sciences, Dharwad. *Major Advisor* : H.G. Shankara Murthy.

Sericulture industry is of special value in the industrialization of a country and there is no problem of seasonal unemployment. At present, it provides employment to 5.5 million persons in the rural areas of India with annual foreign exchange earnings of Rs. 440.27 crores during the year 1990-91. Silk is superior over other textile fibres in many qualities. Hence, it is regarded as the 'Queen of textiles'. India ranks second among the mulberry silk producing countries of the world. Karnataka is the leading producer of mulberry silk accounting for three-fourth of its production in India and Bijapur district occupies second position in Northern Karnataka. The focus of the study was on the economic analysis of production and marketing of silk cocoons. Sericulturists (66) spread over five villages were selected using proportionate random sampling method in Jamakhandi taluk since it was the leading taluk in mulberry cultivation. Field level data for the year 1989-90 were collected through the survey method. Necessary secondary data were also obtained. The statistical methods and technique employed were tabular presentation and Cobb-Douglas production analysis.

Cost of establishing a hectare of mulberry garden was Rs. 2111.17 which was very low. The cost of cultivation (Cost C), gross and net returns per ha were Rs. 18,044, Rs. 32,171.69 and Rs. 14,127.69, respectively. Returns per rupee of investment was Rs. 1.78, indicating a net profit of 78 paise for every rupee invested. The cost of cocoon production was estimated at Rs. 36,281.80 per ha out of which the cost on mulberry leaves was the highest and the respondents used excess mulberry leaves. The gross and net returns from cocoon production per ha were Rs. 88,961.96 and Rs. 52,680.16, respectively. The net income per rupee

of investment was Rs. 1.45, giving a net profit of 45 paise for every rupee invested.

The production function analysis of mulberry crop revealed that the cost incurred on irrigation, human labour, FYM, fertilizers and P.P. chemicals were higher than warranted. The cost of marketing of cocoons per quintal was Rs. 560.93. Transportation charge had the highest share because of the distance at which Ramanagar and Kanakapur markets are located.

Problems encountered by the sericulturists were the incidence of leaf eating caterpillar, thrips, jassids and occurrence of powdery mildew and leaf spot diseases in the cultivation of mulberry. Attack of uzifly, incidence of grassery and muscardine diseases in silk worm rearing, lack of transportation, loss in quantity and quality of cocoons in transit, wastage of cocoons in sampling and extra money demanded for quick weighment were the marketing problems experienced by producer-sellers.

Policy implications emerging are the recommended to use of S-54 mulberry variety over M-5 variety. The use of nylon mesh for individual tray to control the uzifly menace was recommended. Sericulturists should be advised to produce cocoons through vertical integration with mulberry leaf production which minimised the cost. This enterprise should receive utmost priority as a labour absorbing activity. There is no need to raise the scale of finance. In the state Department of Sericulture there is a need to establish one sericulture cooperative society for each *taluk* to revitalise the existing reeling units and to arrange for transport of cocoons to distant markets. The strict supervision on the working of the market functionaries is essential, and the reelers are to be educated. There is a need for the reelers to avoid wastage of cocoons while drawing samples.

Patare, R.N. 1991. Farm Planning of Individual Farms in Ratnagiri District Konkan Krishi Vidyapeeth, Dapoli. *Major Advisor* : S.G. Borude.

The present study was an attempt to examine the imbalances and inadequacies existing in the allocation of farm resources under the present cropping system and to suggest the reallocation of these resources optimally in different size groups of holdings. The study is of practical importance for advancement in agriculture at individual farm level because resource allocation is the main factor affecting the efficiency of production in agriculture. There is scope for increasing income by reallocation of available resources and use of additional resources where they are

inadequately used. Considering the importance of this problem in the Ratnagiri district, a study on "Farm planning of individual farm" was undertaken in this district (i) to assess individual farm resources viz., land, labour, capital and management, (ii) to suggest alternative plans (a) with existing resources and level of technology, (b) with additional resources and 50 per cent recommended technology and with reallocation of area under different crops, (c) with additional resources and with adoption of 100 per cent recommended package of practices, with a view to maximize profit, and (iii) to know the comparative profitability of different crop enterprises.

Data were collected from 30 cultivators, fifteen from Pisai (unirrigated village) and fifteen from Murud (irrigated village) of Dapoli *tahsil* for the 1939-90 season. The farm plans were prepared by budgeting and linear programming techniques to develop the alternate plans.

The results of the study revealed that most of the crops grown by the sample farmers were food grain crops, mainly to satisfy consumption needs of the families.

There was less adoption of high yielding varieties and other inputs. As a result, production, income and employment were limited. Some of the farm resources like family labour remained unutilised.

In improved plans, reallocation of available area under different crops by considering profit margins, resulted in higher gross and net profits. By preparing improved alternate plans with the adoption of new technology step by step, even by borrowing capital, income and employment opportunities on the farms increased two to three times, and the available resources on the farms were also carefully utilised.

The increase in farm business income was in the range of 36.33 to 88.40 per cent in irrigated farms and 45 to 80 per cent in alternate plan I of unirrigated farm by budgeting technique, in the same groups. The farm business income increased in the range of 30.37 to 79.88 per cent in alternate plan II and 62.82 to 152.88 per cent in alternate plan III in all the size groups of irrigated farms. In unirrigated farms, the farm income increased from 81.72 to 111.78 per cent in Alternate Plan II and from 153.89 to 247.75 per cent in Alternate Plan III in the various size groups by linear programming technique.

Alternate plan with adoption of 100 per cent recommended technology and with unlimited capital gave the highest income over the existing

and other alternate plans both by budgeting and linear programming techniques.

Phull, Archana. 1991. Economic Analysis of Rabbit Farming in Kangra District of Himachal Pradesh. Himachal Pradesh Krishi Vishva-vidyalaya, Palampur. Major Advisor : T.V. Moorti.

Breeding of rabbits for meat, fur and high quality wool provides substantial source of income and gainful employment. Rabbit farming as an industry is gaining popularity in cooler and temperate parts of Northern India particularly in J & K and Himachal Pradesh. The present study was undertaken in Kangra district of Himachal Pradesh. The investigation aimed at finding out the economic viability of rabbit farming in the study area with specific objectives of working out the cost of production and net returns from rabbitry unit for wool, input-output relationship, technological gap and social, institutional, operational and marketing problems of rabbit farming.

Kangra district in Himachal Pradesh was purposively selected. Complete enumeration of the farms was done in the study area. Cumulative cube root frequency method was adopted to develop small, medium and large farm situations. There were 57 farms in all, constituting 14 small, 30 medium and 13 large farms. Tabular analysis and regression analysis were employed for different objectives.

The average capital investment per 60 animals was highest on large farms (Rs. 50,334) as compared to medium (Rs. 40,104) and small farms (Rs. 41,922). The small farms had a relatively higher cost of rearing. The net returns over variable cost increased with the size of the herd. Small farms were not economically viable. Input-output relationship indicated that the response of feed was highest on all farms. There were decreasing returns to scale on all farms. Maximum technological gap existed for the use of roughages followed by cage space. Main problems of the rabbit farmers were non-availability of fresh blood, non-remunerative prices of output, lack of technical know-how, incidence of diseases and inadequate marketing facilities.

On the basis of this study it is suggested to establish organised wool markets in the state, provide adequate financial assistance the technical know-how and facilities regarding availability of fresh blood of pure

strain at frequent intervals to the rabbit farmers in order to make rabbitry more paying. Lastly, it is suggested to create general awareness among people to adopt rabbitry as a sole or supplementary enterprise.

Sar, S.S. 1991. Economics of Nutrition of Rural Households in Thane District (M.S.). Konkan Krishi Vidyapeeth, Dapoli. *Major Advisor* : G.G. Thakare.

Food is a basic need. To maintain a good health, better nutrition is essential which is supplied by a well balanced diet. Better health and nutrition holds the key to all economic development. No research work has been done about the nutritional status and consumption pattern of the rural population in Thane district. Hence, the present study was undertaken,

- (i) to study the consumption pattern of households in respect of different food items,
- (ii) to study the level of nutrition in terms of calorie and protein from different items and comparing them with nutritional standards,
- (iii) to study the cost of diet and proportion of income spent on food,
- (iv) to study variation in nutritional levels among different families and identifying factors responsible for such variation and
- (v) to study the extent of imbalance in the diet i.e. calorie-protein imbalance and cereals-pulses imbalance.

The sampling method used for the selection of households consisted of three stage random sampling. Eight villages were selected from four tahsils of Thane district randomly. The households were selected on the basis of probability proportion to size. In all 120 households were selected, out of which 35 per cent were tribal households.

The quantities of foodstuffs consumed by the rural people were converted into calories and proteins by multiplying with calorie and protein coefficients. On this basis the calories and protein intake were estimated. Tabular analysis and statistical tools such as arithmetic average,

percentages and frequency distribution were used to draw conclusions. The multiple linear regression analysis was carried out to estimate the influence of various factors on the intake of calories and protein.

The results of the study revealed that the consumption of cereals, pulses, other vegetables and fresh foods and eggs were higher than recommended daily allowance, whereas the consumption of fats and oil, roots and tubers and milk and milk products were higher than the needed minimum. Average calorie intake of sample households (2381 calories) was nearer to recommended intake level (2400 calories), while protein intake (62 gms) was more than needed minimum (45 gms). The landless labourer, marginal farmer and small farmer households were consuming inadequate calories while other groups were consuming adequate calories. The protein intake of land-less labourer and marginal farmer households was lower than needed minimum while all other groups had adequate protein intake.

The per day per capita cost of diet of rural people was Rs. 7.46. They spend nearly four-fifths of their income on food-stuffs. The proportion of spending was higher in case of landless labourers, marginal and small farmers.

Diet of rural people in Thane district is imbalanced both in respect of calorie-protein ratio and cereals-pulses intake ratio which was 38.29 : 1 and 9.38 : 1, respectively as against a recommended ratio of 53.33 : 1 and 11.00 : 1, respectively.

Sharma, Hirendra Kumar. 1991. Growth Rates, Input Use and Profitability of Cumin in Jalore District of Rajasthan. Rajasthan Agricultural University, Bikaner. *Major Advisor* : K.P. Sharma.

The present study endeavours to estimate the growth rates, input use and profitability of cumin in Jalore district of Rajasthan. Jalore district was purposively selected on the basis of highest area and production of cumin in Rajasthan. One *tehsil* viz. 'Bhinmal' out of five *tehsils* was selected randomly. A sample of 45 farmers was drawn from three randomly selected villages in the *tehsil* (viz. Daspan, Nartan and Kora) where cumin cultivation is practiced. From each village, fifteen holdings were selected in proportion to frequency of holdings in each of the three size groups formed on the basis of size of the holding. The data collected from these farmers for the crop year 1989-90 were analysed using tabular and functional analysis and correlation and regression analysis.

The linear growth rates of area, production and productivity of cumin in Jalore district during the year 1973-74 to 1987-88 were 5.50,

10.82 and 3.01 per cent per annum and that of Rajasthan were 1.77, 6.36 and 3.43 per cent per annum respectively. The compound growth rates of area, production and productivity of cumin in Jalore district were 4.71, 7.34 and 2.53 per cent per annum and that of Rajasthan were 2.46, 5.67 and 3.15 per cent per annum, respectively, during the year 1973-74 to 1987-88. The overall use of seeds was estimated at 16.44 kg. per hectare. The overall use of F.Y M. was 13.91 q per hectare. The average use of fertilizer was 75.26 kg per hectare. The overall use of plant protection measures was estimated at 19.01 kg per hectare for cumin cultivation in the study area. The average cost of cultivation per hectare of cumin was estimated at Rs. 13484.08 per hectare. The average net income and the average return per rupee were estimated as Rs. 7093.00 per hectare and 1.98, respectively. The average cost of production and average market receipt were estimated at Rs. 1264.02 and Rs. 2511.19 per q respectively. Thus a farmer could earn a profit of Rs. 1247.00 per quintal. In production function analysis of the data, the most important variable in cumin production was insecticides and chemicals which yields an additional return of Rs. 45.34 on per rupee investment on this item. Another important variable was fertilizer and manure which gave an additional return to the tune of 3.36 on per rupee investment. The marginal value productivity was less than unity (factor cost) i.e. 0.49 in the case of human labour which indicated that human labour is used excessively.

Shendage, M.N. 1991. Economics of Preparing Mango Grafts in Ratnagiri District. Konkan Krishi Vidyapeeth, Dapoli. *Major Advisor* : E.R. Patil.

Mango is the most important fruit crop of India. In spite of India's dominant position in mango production, the performance of this fruit on the export front has not been satisfactory. It is therefore, necessary to increase the production of mango. The Government of Maharashtra has launched an ambitious programme of plantation of fruit crops through Employment Guarantee Scheme. Mango is one of the important crops included in the scheme. Therefore, there is an increasing demand for mango grafts in the Konkan region. As a result, the farmers from the Konkan region started the business of mango nursery. So far, no research study was taken up to know costs and returns in the region systematically considering the importance of this business activity in the area. A study on "Economics of preparing mango grafts" was undertaken in Ratnagiri district with following specific objectives :

- (i) study the different methods used in preparation of mango grafts,
- (ii) estimate the costs and returns from the preparation of grafts,
- (iii) estimate the total production of grafts in the district,
- (iv) study the employment generated through nursery activities,
- (v) study the financial resources of the nurserymen, and to
- (vi) know the problems faced by the nurserymen and their suggestions to overcome them.

Data were collected from 38 nursery owners from four *tahsils* of Ratnagiri district for the year 1989-90. The results of the study indicated that about 89 per cent nursery owners had adopted the stone grafting technique because it was simple, easy and quick method. Per nursery total number of grafts prepared at overall level was 10,714 out of which 93 per cent were stone grafts and only seven per cent were inarch grafts. At overall level, per nursery total number of grafts prepared was 95 per cent for Alphonso variety only.

The study further revealed that 76 per cent nursery owners had prepared temporary shed for their grafts and per nursery total capital investment on shed was Rs. 5708.76.

The total capital investment was Rs. 40,290.60 out of which maximum (50.97%) was shared by land followed by irrigation structures (22.57%), sheds (14.17%) and hand tools and machinery (12.79%).

Total cost of preparing 1000 stone grafts was worked to Rs 4935.73, out of which Rs. 3073.34 (62.27%) was input cost and Rs. 1862.39 (37.73%) was indirect cost. The cost per graft on prepared and sold basis was Rs. 4.94 and Rs. 8.34, respectively. In case of inarch grafting, per 1000 grafts, the cost of preparation was worked to Rs. 7178.41, out of which input cost was Rs. 4759.57 (66.30%) and indirect cost was Rs. 2418.84 (33.70%).

Per nursery, 6426 grafts were sold, of which 92 per cent were stone grafts and remaining were inarch grafts. The total value received from the sale of grafts per nursery was Rs. 96,422.85. The major source of finance for the nursesymen was found to be nationalized banks through which 73.33 per cent of the total borrowers borrowed.

The average mortality due to incidence of pests and diseases was 15.65 per cent.

The estimated total production of prepared and saleable grafts in

Ratnagiri district is worked out 9,75,017 and 5,84,747, respectively. Total employment generation through nursery activities in the district is estimated at 40,376.70 mandays of which 4937.66 mandays are skilled labour and 35,439.04 mandays are unskilled labour.

Inadequate marketing facilities and imposition of sales tax were the major problems expressed by all the sample nurserymen. The other important problems were inadequate water supply during summer season, non-availability of skilled and unskilled labour, problems regarding mortality of grafts, etc.

The major suggestions made by the nurserymen were that grafts should be purchased by State Department of Horticulture at fixed rate every year, sales tax should be exempted from the sale of grafts, subsidy should be given to nurserymen for the purchase of machinery and equipments, efforts should be made to minimise mortality and technical know-how should be given to nurserymen.

Talekar, P.D. 1991. Economics of Production and Marketing of Pulses in Raigad District (M.S.). Konkan Krishi Vidyapeeth, Dapoli.
Major Advisor : R.P. Thakare.

With the introduction of high yielding variety seeds and improved package of practices of production, the area, production and productivity of pulse crops are increasing at substantially higher rates during the recent past in the Konkan region. Among the districts of Konkan, the growth rates are highest for Thane district followed by Raigad district. The present study was undertaken to,

- (i) study the costs and returns of different pulse crops grown in Raigad district,
- (ii) investigate the resource productivities in the production of pulses,
- (iii) study the constraints in increasing the area and production of pulses,
- (iv) study the marketable surplus, marketed surplus and methods of disposal of pulses in the study area, and
- (v) estimate the trends in area, production and productivity of major pulses grown in the study area.

The sampling method followed for selection of pulse growing farmers consisted of three stage sampling, viz., selection of *tahsil*, selection of villages and selection of pulse growing farmers. Three *tahsils* from

Raigad district namely Alibag, Mangaon and Mahad and three villages from each of these *tahsils* were selected. Fifteen pulse growing cultivators were selected randomly from each of the selected villages. Thus, the overall sample consisted of 135 cultivators. Data were collected by survey method for the agricultural year 1989-90. Cobb-Douglas type production function was fitted to determine the functional relationship between resources and output in production of different pulses. To estimate the trends in area, production and productivity of different pulse crops, the secondary data were collected for the period of 1975-76 to 1988-89.

The results of this study indicated that most of the farmers were using traditional technology for production of *kharif* and *rabi* pulses. The comparative economics of pulses production revealed that gram is the most profitable pulse crop followed by *udid*, *wal* and *tur*. The farm business income from all sources revealed that maximum proportionate income is contributed by agriculture and the farm income of marginal and small farms are below the poverty line.

The functional analysis revealed that family labour and seed rate contributed positively and significantly in production of *rabi* pulses on different size groups of farm. The analysis of resource use efficiency of *rabi* pulses revealed that inputs like family labour and seed were under utilized, whereas resources like bullock labour and hired labour were over utilized.

The major constraints in production of pulses were unfavourable weather conditions, high cost of improved seeds, fertilizers, insecticides, lack of marketable surplus and non-remunerative prices. In the study area, most of the pulse crops were grown only for fulfilling the consumption requirement of farm families. Therefore, there was small quantity of marketable and marketed surplus of these crops. The per kg cost of marketing was around Rs. 0.5 which included 60 per cent share of packaging charges and 35 per cent of transportation cost.

The trend analysis revealed that production of pulses in Konkan region and in Raigad district is increasing at a substantially high rate on account of higher growth rate of area under gram, other pulses and *tur*.

Nisha. 1992. Economics of Bee Keeping in Shimla District of H.P. : A Costs Returns Analysis. Himachal Pradesh University, Shimla. *Major Advisor* : K.K. Kaushik.

Increasing job opportunities in rural area is high on the agenda of

development. The contribution of the bee keeping industry in the general economic development are two fold-employment and capital formation. The most important aspect of bee keeping is that it is an important income generating activity for small and marginal farmers, landless labourers, and other weaker sections of the rural society living at or below subsistence level. As one of the oldest agro-based village industries of India, in general, and in the State of Himachal Pradesh in particular, bee keeping has now reached a significant stage in development and holds a pride of place in the industrial and trade structure of Himachal Pradesh. The principal objective of the present study is to examine the cost and return structure of bee keeping industry to gain an insight into its cost conditions and profit potentials in Shimla District of H.P.

Purposive sampling technique was followed to collect primary data of sample bee keepers of Shimla district, who are engaged in this enterprise on commercial scale. The reference year for the study was 1990-91.

Cost structure of the industry reveals that fixed cost is only Rs. 155.47 in a total cost of Rs. 543.43 per bee-colony. Average yield per hive is estimated to be 25.88 kg. Thus, the average fixed cost per kg of honey comes to Rs. 6.01. Total variable costs turned out to be Rs. 387.96 per colony and Rs. 15.95 per kg of honey. Amount of sugar, migration expenditure and labour's wages accounted for major share of variable costs. The total cost of honey production was estimated at Rs. 543.43 per colony and Rs. 21.96 per kg of honey.

Total gross returns were from sale of honey, beeswax and bees and gross returns were Rs. 1009.93 per colony and Rs. 39.06 per kg of honey. The net returns were worked out to be Rs. 466.50 per colony and Rs. 17.10 per kg of honey.

From the study it has been concluded that capital equipment (items included in the fixed costs) is optimally used with larger number of beecolonies whereas the same is not true in the case of small apiary size. Total returns and net returns per colony are affected by the amount of honey, beeswax and selling of bees, which bear no relationship with the apiary size. The more the amount of honey produced, the more are the net returns per bee-colony.

Bee-keeping development activities in the State are looked after by 49 Government Bee-keeping Stations/Demonstration Apiaries and these demonstration apiaries supply various inputs to bee keepers and buy their honey produce at support price. The present status of annual production of honey in Himachal Pradesh is 250-300 metric tonnes by commercial bee-keepers, small-scale bee keepers and at the government demonstration apiaries. Out of the total honey production 20% is sold out within the

State and rest is sold in various parts of the country. Himachal Pradesh Khadi and Village Industries Board (KVIB) is instrumental in promotion of this industry's development on commercial scale by way of providing loans and subsidies to the private bee-keepers

Earnest and continuous efforts of the concerned government agencies, supported by extension and research will have a spectacular growth and development of the bee keeping industry in Himachal Pradesh particularly and India in general.

Borate, M.A. 1990. Capital Formation in Agriculture in Thane District.
Konkan Krishi Vidyapeeth, Dapoli. *Major Advisor* : R. P. Thakare.

Capital formation in agriculture involves investment on more capital assets such as machines, tools, equipments and materials which are used for future production of goods. Farm investment includes the investment in the purchase of land, repairs and development of irrigation facilities, building and land development, purchase of farm implements, construction of farm house and cattle shed, purchase of livestock, fencing, etc.

Out of the five districts of Konkan, Thane district is comparatively more developed than other districts. Therefore, the present study was undertaken to

- (i) study the extent of fixed and working capital formation in agriculture on selected farms,
- (ii) compare the extent of capital formation on different size groups and on progressive farms,
- (iii) study the productivity/returns to fixed and working capital, and
- (iv) study the functional relationship between capital formation and cultivated area, gross income, irrigated area and family size.

Out of the 13 *tahsils* of Thane district, 4 *tahsils* namely, Palghar, Shahapur, Wada and Mokhada were randomly selected for the study. Fifteen cultivators from each village were selected randomly. Thus, in all 120 cultivators from 8 villages of 4 *tahsils* of Thane district were considered for the study. In addition to 120 selected cultivators, data from 20 progressive cultivators from Bordi village of Dahanu *tahsil* were collected for comparison. The selected farmers are arranged into 3 groups namely marginal, small and medium farmers, on the basis of size of holding

and the results of overall farms are compared with progressive farms of the region.

The per farm investment on capital assets were observed to be increasing with the size and progressiveness of farms. The capital investment was significantly higher on progressive farms. About 70 per cent of investment in capital assets was in the form of land followed by machinery and equipments, buildings and livestock.

In the per farm capital formation upto 1990 on different size groups of farms, about 80 per cent of capital formation had occurred during the last decade (1980-90), indicating both high rate of saving and easy accessibility to institutional finance during the last decade.

Per farm working expenses, gross income, returns over working capital and input-output ratio in crop production increase with the size and progressiveness of farms. Small and marginal farmers were more dependent on other occupations like service, labour earnings, bullock hiring and animal production. Whereas, the percentage contribution of crop production in total farm income increased with the size and progressiveness of farms. Lower rate of capital turnover on medium and progressive farms and the lower operating ratio on medium and progressive farms, indicated excessive capitalization and efficient use of working capital, respectively on these farms.

The percentage of borrowing from financial institution was observed to be increasing with the increase in farm size. The percentage contribution of credit from financial institution was less on progressive farms as compared to overall farms.

The main purpose of borrowing from financial institution was for purchase of machinery and equipments and land development bank was observed to be the leading financing institution in the study area.

Out of the different factors affecting the capital formation, gross income was observed to be major factor influencing the capital formation positively and significantly. The cultivated land and working capital were observed to be affecting the gross income on selected farms positively and significantly. The marginal value product of cultivated land and working capital were observed to be higher on progressive farms as compared to overall farms of the region.

Bora, R.K. 1990. An Economic Appraisal of Integrated Rural Development Programme (IRDP) in Borbaruah Development Block of Dibrugarh District, Assam. Assam Agricultural University, Jorhat. *Major Advisor* : A.K. Sharma.

Integrated Rural Development Programme (IRDP) is the single largest antipoverty rural development programme currently operating in rural areas. Its main objective is to raise the standard of living of the rural poor. The programme has incurred huge investment during the last one decade. In order to justify the continuation of the programme in future at huge cost, it is necessary to examine its effect upon the beneficiary. The present study was an attempt in this direction and was conducted in Borbaruah Development Block of Dibrugarh District of Assam. The objectives of the study were, (1) to study the identification process of IRDP beneficiary and the particulars of assistance received by them; (2) to study the impact of IRDP on beneficiary's income, employment, asset formation, consumption expenditure, and in uplifting the beneficiary above the poverty line, (3) to study the economic performance of major IRDP schemes and (4) to study the socio-economic constraints involved in the implementation of IRDP scheme.

A sample of 80 beneficiaries were selected by probability proportional to size (PPS) from 10 IRDP villages who received assistance during 1988-89 under different schemes for crop production (purchase of bullock), livestock production and Industry Service and Business (ISB) schemes. In addition, 40 non-beneficiaries were also selected from the above villages to compensate the effect of price and other factors. Data were collected for the two periods of time i.e. pre-IRDP and post-IRDP period. The impact of the programme was examined by comparing the changes in the value of variables between pre and post-IRDP period.

The results showed that there had been a shift in the occupational pattern of the beneficiary towards the high paying ISB/off-farm and livestock activities from the low paying crop production activities. This was supported by the fact that the operational holding as well as the cropping intensity of the beneficiary were less in the post-IRDP period than the pre-IRDP in all the categories of beneficiary. The identification process of the beneficiary was discretionary as 17.5 per cent of the total sample beneficiary were found to be non-target group, the proportion of which was more in the bigger land holding category of beneficiary. ISB was the most important scheme in terms of the number of beneficiary receiving the assistance while it was livestock schemes which were more important in terms of the amount of assistance received by the beneficiary.

The programme had significantly increased the income and employment of the landless and marginal farm beneficiary but not the small farm beneficiary. On an average, the beneficiary's household income increased by Rs. 1679 (30.26%). For landless, marginal and small farm beneficiary, the increase in income was 36.67, 31.70 and 23.85 per cent, respectively. The average mandays of employment generated by IRDP for the landless, marginal, small farm and all the beneficiary household together, were found to be 30, 35, 24 and 31 mandays, respectively. The net increase of employment was little bit more than the above figures. Off-farm/ISB activities contributed more to the generation of income and employment followed by livestock in all the category of beneficiary households.

The consumption expenditure of all the category of beneficiary household also increased in the post-IRDP period as compared to pre-IRDP period. However, the marginal propensity to consume in the post-IRDP period as compared to pre-IRDP period was less in case of landless and marginal beneficiary while it was more in case of small and all the beneficiary together. Indirectly it implies that IRDP resulted in increase in savings through increase in income in the case of lower land holding category of beneficiary than their larger counterparts. About 42 per cent of the properly identified beneficiary (and about 52 per cent of the total sample beneficiary) were found to cross the poverty line due to IRDP. Only very few schemes, that too mostly from ISB were found to cross the poverty line due to IRDP. Only very few schemes, that too mostly from ISB were found to be economically viable. This was because ISB schemes were more remunerative and profitable than livestock and crop production schemes. This was also supported by repayment performance of loan which was relatively more for ISB than the livestock and crop production scheme. The results thus revealed that IRDP achieved certain amount of success in fulfilling its objectives in the study area. However, the programme suffered from a number of socio-economic constraints as perceived by the beneficiary viz; lack of regular official supervision, poor quality of assets provided by the authority, delay in loan disbursement by Bank and Block sources, low amount of assistance received as compared to planned, beneficiary dissatisfaction towards the scheme, lack of awareness of the beneficiary towards the programme and lack of infrastructural facilities such as in adequate market and block offices within accessible distance of the beneficiary household.

These socio-economic constraints if overcome, IRDP will achieve further success in future.

Dhabugade, S.S. 1990. Study of the Impact of Nationalised Bank Finance on Agricultural Development in Dapoli *Tahsil* (Ratnagiri District). Konkan Krishi Vidyapeeth, Dapoli. *Major Advisor* : S.G. Borude.

In the context of recent technological development in agriculture, the entry of nationalised banks in the field of agricultural finance has created some impact on the economy of beneficiaries in India. It has brought changes in the adoption of agro-techniques, increase in income and employment. The purpose of present investigation was to measure such an impact of nationalised bank finance on agricultural development in Dapoli *tahsil* of Ratnagiri district.

Bank of India, the lead bank of the district was selected purposively. The activities viz. dairy, goat keeping, bullock/bullock cart purchase and purchase of electric motors for irrigation were selected for study as good amount of financing was made under these schemes. The data were collected for two points of time i.e. before taking loans and after taking loans. For measuring the values of assets, constant prices were considered to avoid increase in values due to price rise.

Increase in value of total assets after borrowing was highest in dairy activity (25.59 per cent), followed by irrigation (17.86 per cent), goat keeping (16.62 per cent) and bullock/bullock cart hiring (14.77 per cent) activities. There was 33.67, 64.28, 13.15, 14.82 per cent increase in area under high yielding varieties of rice of the farmers having dairy, goat keeping, bullock/bullock cart and irrigation activities, respectively. Per hectare consumption of fertilizers for rice crop increased by 121.46, 57.28, 54.02 and 68.99 per cent in above activity groups, respectively. Per hectare yield of paddy increased by 16.57, 12.70, 19.18 and 18.27 per cent on the farms of borrowers for dairy, goat keeping, bullock/bullock cart and irrigation activities, respectively. Thus, there was higher rate of adoption of new technologies and hence, higher yields on the farms of borrowers.

Increase in total income was the highest in dairy activity (60.59 per cent) followed by goat keeping (57.91 per cent) and bullock/bullock cart hiring (55.79 per cent) activities. The farm business income from specific activities increased by 3496.81 per cent in dairy, 2687.92 per cent in goat keeping, 4887.09 per cent in bullock/bullock cart and only 22.48 per cent in irrigation activities. Thus, in activities like dairy, goat keeping and bullock/bullock cart hiring there was substantial increase in farm business income. This has helped them to spend more money on technical inputs and obtain higher yields in rice. There was also considerable amount of

increase in employment, particularly from dairy, goat keeping and bullock cart hiring activities.

Gogoi, Sanjeev Kr. 1991. A Study of Resource Optimization in Cropping Pattern Under Irrigated and Rainfed Situation in Rupahi Block, Nagaon, Assam. Assam Agricultural University, Jorhat. *Major Advisor* : B.C. Bhowmick.

The present study was conducted in Rupahi Circle, under Rupahi Development Block, Nagaon, with a view to examine the scope of increasing farm income through optimal allocation of different farm resources in various size group of farms under two situations viz; irrigated and unirrigated. A multi-stage stratified random sampling technique was used to collect primary data. A sample of 51 farmers under irrigated situation and 50 farmers under unirrigated situation were selected randomly from four villages. The study was designed to make a comparative study between irrigated and unirrigated farms in regard to their farming system, utilization of scarce resources, generation of net returns and also, to examine the effect of irrigation on crop production. A deterministic linear programming model was used as the analytical tool for the optimization of resource use, while tabular analysis was used for substantiating other objectives like existing resource-use pattern, homestead farming, etc. for the various size-groups of irrigated and unirrigated farms.

Mixed farming was found to be prevalent in the study area, with crop+dairy+poultry as the dominating activities under both the situations. Cropping intensity, utilization of the farm resources like labour (human and bullock), working capital and net-returns obtained under irrigated farms were found to be comparatively higher than that of unirrigated farms. Irrigation was found to have a positive effect in increasing the yield and farm net-return of the irrigated farms. Homestead farming covered more than 6 per cent of the total area, employed more than 6 per cent of the total labour utilized, more than 8 per cent of the total working capital, besides contributing a share of more than 16 per cent net-return to the whole farm business.

Several optimal plans were developed from the existing plans. Out of these optimal plans, the optimal plan (P2) proved to be the most practical and acceptable solution for determining suitable enterprise-mix as it provided the highest net return, besides increased employment of labour and utilization of working capital. Net-returns in irrigated farms were comparatively higher than the unirrigated farms in all the optimal plans.

Hazarika, Chandan. 1987. A Study of Farm Level Storage Problem for Rice in Jorhat District of Assam. Assam Agricultural University, Jorhat. *Major Advisor* : K.C. Talukdar.

The study was conducted in Titabor Development Block of Jorhat district of Assam during 1985-86 crop year. The main objectives of the study were (i) to examine the factors affecting the storage of rice by size of holding (ii) to study the economics of storage of rice, (iii) to work out the optimum level of net returns under various constraints and (iv) to study the seasonal price movements, market arrivals and returns to storage of rice in Jorhat district of Assam. Cross-sectional primary data were collected during 1985-86 crop year for summer and winter rice. Multistage stratified random sampling was followed and altogether 73 farmers were selected for interview comprising 33 marginal, 30 small, 5 medium and 5 large farmers. The farmers were classified into different size categories following the criteria adopted by SFDA, Government of Assam.

The step-regression analysis indicated that the level of storage was mainly influenced by the factors like total production, size of holding, total consumption, level of debt, non-market transactions, storage capacity and farm income. The sum of the elasticities, with respect to these variables, being greater than unity for all the categories of farmers indicated the changes in these variables were highly responsive to the total amount stored. It was also seen that upto 3 hectares of holding, storage for consumption was greater than the storage for speculation.

The storage cost of rice was found to be maximum in case of 'Gutibharal' (Rs 36.51/q) and minimum in case of Duli/Barpachi (Rs. 10.95/q). The storage losses were also found to be maximum in case of 'Gutibharal'.

Optimization of returns to storage indicated that the farmers should increase their total production to optimize their returns. The small farmers would need a minimum average production of 90.13 quintals against a production of 49.24 quintals to earn a net return of Rs. 2008.12. The medium farmers would need a production of 173.40 quintals against 99.84 quintals to earn net return of 3372.42 from storage during the year. The large farmers would have to increase their production to 210.22 quintals to earn a net return of Rs. 4046.25 from storage during the year.

The market arrivals were found inversely related to price. The regression coefficient of market arrivals on price was -11.90 which indi-

cated that an increase in one unit of price will decrease arrivals by 11.90 unit. The correlation co-efficient was also found to be significant ($r=0.868$).

The returns to storage was maximum in the month of October, while the gross return and net return ratio to storage cost were found favourable only upto the month of May. After May, there were high price fluctuations.

Saikia, Gokul. 1991. Saving and Investment Pattern in Rural Area—A study in Amguri Development Block in Sibsagar District, Assam. Assam Agricultural University, Jorhat. *Major Advisor* : A. Saikia.

Rural economy is generally based on agriculture. The economic progress of a country depends to a large extent on the performance of agricultural sector. A study of the saving behaviour and trends in investment of the rural sector particularly of agricultural households is relevant from the point of view of understanding the dynamics of agriculture. Saving and investment have important role in agricultural development as well as in the growth of national economy.

The study was conducted in Amguri Development Block in the district of Sibsagar with the objectives to study the pattern of income and expenditure among different farm size-groups, the nature and amount of saving in relation to different farm size-groups, investment patterns and factors affecting them, and to suggest measure for raising the amount of saving and investment. For this purpose, five villages were selected randomly from 134 villages and from these 96 sample households were selected randomly in four size-groups, viz, marginal (30), small (41), medium (14) and large (11).

Saving in the area depended mainly on the income generated from crop cultivation. Other sources of income viz., salaried job and wages, business, professions, etc. were significant in the study area. Per capita income was found to be Rs. 2273.92. Low per capita income was due to non-adoption or very low level of adoption of modern methods of cultivation and non-development of allied agricultural activities and rural industries. Per capita expenditure in the area was found to be Rs. 1863. From the study, it was observed that marginal and small farmers had very little savings. Rather they were found in debt. The medium and large farmers had some surplus income. Per capita financial saving in the area was found to be Rs. 82.99.

Investment pattern was found to depend on amount of saving, decisions about investment, rural infrastructure, etc. Investment in crop production had the highest share followed by business and professions, construction and repairing of farm houses, purchase of livestock, improvement of land, purchase of agricultural implements and machineries, etc. It was observed that per capita investment increased along with increase in per capita saving. Per capita investment was found to be Rs. 394.99.

To raise the amount of saving and thereby investment, per capita income should be increased. For this purpose, returns from farm are to be increased by raising production and productivity of crops, development of allied agricultural activities and rural industries. Development of rural infrastructure and motivation of the farmers to take up secondary sources of income are necessary. Effective execution of development schemes by Government agencies in different sectors is another important factor for accelerating returns of the farmers. Growth and mobilisation of saving is an important prerequisite for accelerating the process of economic development.

Singh, B.R. 1991. Marketing of Cattle in Meghalaya. Assam Agricultural University, Jorhat. *Major Advisor* : K.C. Talukdar.

Livestock economy plays an important role in the rural economy of Meghalaya with cattle occupying about 22 per cent of the total livestock population in the state. However, an efficient marketing system allocates resources and distributes income for accelerating economic development. The study was an attempt to analyse the cattle marketing pattern and to suggest for its improvement in the state.

Baridua Cattle Market was purposively selected for studying the market structure, conduct and performance. Both secondary and primary data were used for the study. A total of 32 market functionaries and 95 farmers of the Myllem Development Block were selected. The farmers were selected based on stratified random sampling technique. Study of market structure indicated that the total number of sellers in the market were 124, 118 and 125 in 1985, 1987 and 1990, respectively. The coefficient of inequality for buyers varied from 0.92 in 1985 and 0.73 in 1988. In 1990 it was 0.79. The disposals of cattle had a direct and significant impact over prices of cattle.

Cattle market in the state had an inadequate market information system. Vertical integration was observed in the beef-cattle-trade with

80 per cent of sellers and 95 per cent of the buyers being itinerant traders cum wholesaler and butchers cum meat retailers, respectively. About 5 per cent of the sellers were wholesalers cum retailers in the milch cattle trade.

In the cattle market, five four and two channels of distribution were identified for beef, draught and milch cattle, respectively. For draught and beef purpose cattle the highest cost of Rs. 800 each were incurred by the distant wholesalers. In the milch cattle trade the highest cost of Rs. 197 was incurred by the rearer. The highest total margin was earned in Channel III (cattle rearer-local wholesaler-Butcher cum Meat retailer-consumer) for beef cattle being 78.75 per cent of the spread. In case of draught cattle the highest margin earned was 58.76 per cent of the spread in channel III. Only the wholesaler cum retailer earned a margin in the milch cattle market and it was 2.61 per cent of his sale price. The highest spread in case of beef, draught and milch cattle was 58.10, 37.14 and 4.17 per cent of the consumers' price, respectively. The highest producer's share in consumer's rupee was 64.75, 84.80 and 98.36 per cent for beef, draught and milch cattle, respectively. Marketing was found to be more efficient in channel I (Cattle rearer-Butcher cum meat retailer-consumer), II (Rearer-Itinerant trader-farmer, III (Rearer-wholesaler cum retailer-farmer) for beef cattle, draught, milch cattle with marketing efficiency of 11.43, 5.03 and 1.56 per cent, respectively.

The market arrival was found to be the highest in March with a seasonal index of 148.62 and the lowest in September with a seasonal index of 75.98 per cent. The coefficient of variation for arrivals was the highest in the year 1985 (43.56%) and the lowest in 1990 (16.60%). Within a month, the variation was the highest in September (49.17%) and the lowest in the month of June (5.35%). In case of price, the highest coefficient of variation was (10.92%) in the year 1990 and it was in the month of September (19.19%). The lowest co-efficient of variation was 0.86 in 1986, and it was in the month of May (4.28%). The seasonal index for cattle price was highest at 103.32 per cent in January and lowest in May at 95 per cent.

The value of assets in the dairy farm of the small, medium and large farmers were found to be Rs. 1,40,708, Rs. 26,4362 and Rs. 5,22,215, respectively. The total value of livestock reared by the small, medium and large farmers were Rs. 1,30,078, Rs. 2,21,132 and Rs. 4,13,115, respectively.

It was observed that in the year 1988-89, a total of 44,903 cattle

entered the state of Meghalaya and the highest percentage of cattle (80%) was traded from Assam. Maximum number of cattle went out of the state of Assam with an average of 408 heads per month followed by Mizoram with an average of 200 heads per month.

Datta, Debajit. 1992. Analysis of Economic Efficiency in Cropping Pattern Across Different Size-Groups of Farms in Titabor Development Block (Jorhat). Assam Agricultural University, Jorhat. *Major Advisor* : B. C. Bhowmick.

The study was conducted in Titabor Development Block (Jorhat) using a multistage stratified random sampling technique. In total, 54 most progressive farmers (MPF) and 66 relatively less progressive farmers (RLPF) were selected from six randomly selected villages of two AEO circles of the block. The study was designed to analyse the cropping and resource use pattern and also to estimate the economic (in) efficiency of different size groups of farms. A deterministic linear programming model was used as the analytical tool. Tabular analysis was also used to meet other objectives of the study.

Mixed farming was found to be prevalent in the study area, with MPF farms having crop + dairy + poultry and RLPF farms having crop + dairy + pigeon as the dominating activities. The resource use per unit were comparatively more in MPF farms than that of RLPF farms. Homestead farming was found to have provided employment to about 5 percent of total labour employment and contributed a share of above 10 percent net return to the whole farm business.

Several optimal plans (P_1, R_1, P_2, R_2, P_3) were developed with the imposition of minimum area restrictions and also with immobility, partial mobility and full mobility of factors of production to estimate the economic (in) efficiency of different size groups of farms.

From the study, it was revealed that there exists considerable economic inefficiency in the agricultural system of Titabar. The inefficiency was estimated as 51.48 per cent, which indicated the difference between the potential (optimum) output and actual output. Of the total 51.48 per cent economic inefficiency, the contribution made by technical and allocative inefficiency was of the order of 30.31 and 6.19 percent, respectively. On the other hand, system rigidities and imperfections were responsible for 45.29 per cent of the total inefficiency.

Economic efficiency achieved by small and large farmer were to the tune of 44.72 percent and 59.93 percent, respectively. The large farmers

were found to be technologically and allocatively efficient over small and medium farmers.

Neither the system (the environment) nor the individual is economically efficient both in terms of technological and allocative efficiency, for the economy of Titabar as a whole. System rigidities and imperfections like imperfect diffusion of technological knowledge, immobility and insufficiency of factors of production in the commodity and factor markets, imperfect competitions in the factor and product markets (i.e. presence of monopoly and monopsony situations), etc. should be reduced to get an overall efficient economy.

Karjee, Dhiren. 1992. Farmers Credit Requirements for Jute Cultivation under Improved Technology—A case study in Borkhetry Development Block of Nalbari District, Assam. Assam Agricultural University, Jorhat. Major Advisor : B. K. Barooah

Amongst the crops cultivated in India, Jute is an important cash crop grown particularly in the Eastern and North Eastern states. At present raw jute products form one of the important sources of earning foreign exchange for the country. Therefore, improvement of jute cultivation is inevitable, which, however, is possible through introduction and adoption of new production. Adoption of new farm technology demands additional investment of capital. The present study was aimed to examine the farmer's credit requirements for jute cultivation under the recommended farming practices along with the problems faced by the jute growers in Borkhetry Development Block of Nalbari district, Assam. A total of 96 sample units were selected randomly from the block. Farmers were categorised into marginal, small and large based on their operational holdings under different crops.

In the study area, 49 farmers were using traditional technology and 47 adopted improved technology to some extent. The production of jute fibre was 1076.69 quintals during 1990-91 which was highest in the large size group of farms. The productivity of jute varied from 1382 kg per hectare in large traditional farm to 2183 kg per ha in marginal improved farms. The variable cost varied from Rs. 3410.88 per ha in large traditional to Rs. 4284.86 per ha in medium improved farm. The total (Cost C) varied from Rs. 5029.49 to Rs. 6202.38 per hectare depending on farm size and level of technology adopted by the farmers. Per hectare net income ranged from Rs. 75.09 to Rs. 166.25 under traditional farms and Rs. 1537.95 to Rs. 1917.88 under improved farms.

Credit needs of the jute growers are met by both institutional and non-institutional sources. The number of households accommodated under non-institutional sources were much higher than the institutional sources. Among the non-institutional sources, money-lenders were important for all size group of farms followed by relatives and friends.

Certain problems such as administrative/procedural difficulties, inadequacy of loans, insufficient security, high rate of interest, non-availability of adequate extension facilities, lack of proper supervision in credit obtaining and utilization were identified by the jute growers in the study area.

Per hectare credit requirements were estimated to be Rs. 2532.53 in traditional farms and Rs. 2035.40 in improved farms for adopting the recommended package of practices in jute cultivation. It varied from Rs. 1956.83 in marginal improved farms to Rs. 2581.74 in small traditional farms.

Expected increase in farm income from recommended full packages (over traditional practice) would be 42.27 percent in the overall farm situation. Thus, in the study area, there is scope for jute growers to increase their farm income by adopting the recommended practices, which requires adequate credit facilities.

Nath, Jyotish. 1992. A Study of Resource Use Efficiency of Boro Rice in Dimoria Tribal Development Block of Kamrup District, Assam. Assam Agricultural University, Jorhat. *Major Advisor*: B. C. Bhowmick.

The rationality in the allocation of resource shown by the farmers in traditional Indian agriculture was pointed out for the first time by Schultz. But in the past studies, the focus was on the aggregate crop level. Indian agriculture being highly diverser, climatic conditions, agricultural practices, types and quantity of inputs used, etc. vary from region to region and from crop to crop. Thus, to get a realistic picture on resource use efficiency, the problem must be analysed at the regional and individual crop level with micro level data. Rice is the major crop of Assam and *boro* rice accounts for an area of about 26-53 per cent. The importance of *boro* rice was felt by the farmers of Assam during last 8-10 years on account of its better yield potential.

The present study was carried out in Dimoria Tribal Development Block of Kamrup district, Assam. A multistage random sampling

technique was adopted for selection of respondent farmers from 4 different size groups viz; marginal, small, medium and large.

The main objective of the study was to examine the relative importance of *boro* rice in cropping pattern and productivity of strategic inputs used in *boro* rice cultivation. A Cobb-Douglas type of production function was fitted to measure the productivity of various inputs used in *boro* rice. *Boro* rice occupied the major share in the existing cropping pattern with 45.48 per cent area followed by *sali* rice with 30.03 per cent area. Employment of labour, utilization of capital and net return in *boro* rice were higher as compared to other crops. *Boro* rice appeared as most comparatively advantageous crop over its competing crops. The percentage increase in net return of *boro* rice over cost, in all the size groups was estimated to be much higher than any other crops included in the cropping pattern. Even the combined net returns of two crops (wheat + *ahu* rice and mustard + *ahu* rice) which were to be foregone for a single *boro* crop was also found to be lower than net return of *boro* rice.

The regression co-efficients and marginal value productivity (MVPs) of different inputs indicated that existing resource use in *boro* rice was not optimal. Among the variables, the regression co-efficients of manure-fertilizers and pesticide were found to be positive as well as statistically significant in almost all the size groups. Hence, there is scope for increasing these inputs in *boro* rice cultivation.

The optimum level of this strategic input was estimated to be Rs. 109.97 in small size groups of farm to Rs. 534.64 in medium size group. Thus, there is scope to increase area under *boro* rice substituting area under its competing crops.

Sharma, Ramani. 1992. A Study of Production Patterns in the Char-Area of Barpeta District, Assam. Assam Agricultural University, Jorhat. Major Advisor : B. C Bhowmick.

This study was undertaken in Barpeta District of Assam in the year 1990-91 using two-stage random sampling technique. The main objective of the study was to analyse the existing pattern of resource use on the existing farming systems and production patterns and to develop appropriate optimal plants using deterministic linear programming technique. The study also covered the aspects of demography and land-tenure systems in the *char*-area.

Out of the total sampled farms, more than 90 percent were Bengali speaking Muslims and rest were Bengali speaking Hindus. The people in the *char*-area were mostly illiterate and living with very poor social

amentities. The land-tenure system in the study area bears a peculiar character. Out of the total land holdings more than 80 percent have been observed to be under 'Annual lease' and 'Touki' and very minor portion of land was under 'Periodic lease'.

A mixed farming system was prevalent in the area with an average cropping intensity of 184.47 percent. Summer and *rabi* seasons were the main cropping seasons. Basically land during *kharif* season was kept fallow on account of recurrent occurrence of flood by most of the size groups except small and marginal groups. Human labour, especially in small and marginal farms, was surplus, whereas capital was a main constraint. The production pattern prevailed in the *char*-area yields more returns from crop enterprises as compared to animal enterprise. The optimal plans revealed that the net farm returns and employment of human labour could be increased even without going for borrowing and extra labour hiring. The crops like lentil, niger and linseed were proved to be non-remunerative and had not appeared in any of the optimal plans. Among crop activities *ahu* rice appeared as the main cereal crop and among animal activities dairy gets major emphasis.

The study revealed that though the agriculture of the *char*-area has been observed to be constrained by different socio-economic factors and vagaries of nature, yet there lies a tremendous scope for improving the existing situation by changing the production pattern by optimum use of existing limited resources.

Sarma, Jayanta K. 1992. Potentiality of Increasing Farm Income and Labour Employment Through Farm Planning-A Study of Golaghat District. Assam Agricultural University, Jorhat. *Major Advisor* : B. C. Bhowmick.

This study was conducted in Golaghat District of Assam using a multistage stratified random sampling technique. A sample of 124 farm households of three size groups *viz.* small, medium and large, were selected for the study. The primary data were collected from the selected respondents by personal interview with the help of a pretested schedule for the year 1990-91. This study was an attempt to demonstrate that there is scope of increasing farm net return and generating additional employment in farm sector by inducing certain changes in the cropping pattern. Proper farm planning helps in incorporating appropriate activities and utilising available resources which in turn maximise farm returns. A deterministic linear programming model was used as an analytical tool for optimising resource use. Tabular analysis as well as linear and

ponential growths were carried out for substantiating other objectives of the study.

Rice appeared as the most important crop in the cropping pattern of the district, followed by rape and mustard from the view point of coverage of area. Notable growth of area over last 12 years was observed in case of rape and mustard, rabi pulses, autumn rice, wheat and sugarcane. HYV *ahu*, sesamum and mustard were noted to be relatively advantageous crops in the respective seasons.

Mixed farming was found to be prevalent in the study area, with crop + dairy + pigeon as the dominating activities. Homestead farming was found to have provided employment to about 13 percent of total labour employment and contributed a relative share of about 33 percent net return to the whole farm business. Small farmers used their cultivable land more intensively as compared to other two size groups. Per hectare utilization of labour was also maximum in small farms. The results of the study revealed that even in the existing plans, there was further scope for increasing farm returns. Human labour was found to be a main constraint in the study area. Incorporation of borrowing and hiring along with advantageous crop activities with improved technology further invigorated all the size groups by increasing cropping intensity, net return and labour employment. The crops like sesamum, mustard, potato, were proved to be remunerative in all the farm sizes and appeared in the optimal plans with a larger area. Among animal activities pigeon and poultry got major emphasis.