contributed maximum to the increased variance of total cereal production followed by interaction between change in mean yield and change in variance of yield.

The analysis of impact of various factors on crop yield variability indicated that for the State as a whole, variability in proportion of total cereal area under jowar and bajra crops positively affected their yield variability in the green revolution period. In case of wheat and rice, however, yield variability in green revolution period was influenced positively by the variability in proportion of crop area under irrigation.

The study indicated that measures towards reducing yield covariances and area yield covariances of the crops, both within and between districts could help in reducing cereal production variability in Uttar Pradesh. For achieving stability, an approach may be grouping of districts having similar environment into different clusters and then developing technology suitable to these clusters. Reducing variability in irrigated area under crops could also be a measure to reduce variability in cereal production.

Halim, R.A. 1989. Pattern of Employment and Income under Different Cropping Patterns—A Study in Jorhat, Nagaon and Goalpara Districts. Assam Agricultural University, Jorhat. *Major Adviser* : A. Saikia.

The present study attempts to highlight the pattern of employment and income under three major cropping patterns of Assam, *viz.*, (a) Rice-Rice, (b) Jute-Rice and (c) Rice-Wheat. The objectives of the study are, (i) to study the nature of employment in agriculture under different cropping patterns, (ii) to study the seasonal variation of employment in agriculture under different cropping patterns (iii) to study the nature of costs and farm income under different cropping patterns, (iv) to analyse the problems faced by the farmers in the adoption of double and multiple cropping patterns and in adoption of new technology in the cultivation of crops and (v) to suggest measures to raise the volume of employment and income in agriculture and to solve the problems of farmers in the adoption of double and multiple cropping patterns under new technology.

One block each from Jorhat, Nagaon and Goalpara districts to represent the three cropping patterns, rice-rice, jute-rice and rice-wheat was selected, respectively. A sample of 189 households were taken from these blocks following "stratified random sampling" procedure.

The annual average employment of workers in crop production was the highest at 92.95 mandays in jute-rice cropping pattern followed by 87.60 mandays in the rice-wheat and 66.49 mandays in rice-rice cropping pattern. The cropping intensity under different cropping patterns were observed to have a direct relationship to the

volume of employment. The annual average employment for female workers was found to be the highest in rice-rice cropping pattern (49-65 mandays). In rice-rice and rice-wheat cropping patterns, per hectare employment of workers tended to decrease with the increase in the size of holding while annual per farm employment of workers was found to have positive relationship with size of holdings. Operation-wise employment of workers indicates that preparatory tillage operation consumed the highest number of mandays annually in all cropping patterns. Cropwise annual average employment of workers in rice, jute and wheat were 67.46, 45.78 and 18.92 mandays, respectively. In rice-rice and jute-rice cropping pattern the busy seasons of farm activities were in the months of July-August and December while in rice-wheat cropping pattern employment of workers was found to be the highest in the months of August, May and March. The per hectare total cost of production of crops was the highest in jute-rice cropping pattern at Rs. 6087 followed by rice-wheat cropping pattern at Rs. 4886 and rice-rice at Rs. 4675. The gross income, farm business income and family labour income were the highest in rice-rice cropping pattern at Rs. 7993, Rs. 5158 and Rs. 3039 followed by jute-rice cropping pattern at Rs. 6772, Rs. 2989 and Rs. 1744 and Rs. 479, respectively. In rice-rice cropping pattern net income from crop production was Rs. 598 while in jute-rice and rice-wheat cropping pattern net income was found negative at cost C level. The study also identified lack of irrigation facilities, financial constraints in case of marginal and small farmers, inadequacy of credit facilities, lack of proper enclosures in the fields, non-availability of inputs in time and within easy reach of the farmers, lack of knowledge about the recommended technologies as the major constraints faced by the farmers in adopting double and multiple cropping and new technology. On the basis of the findings of the study it can be suggested that with adequate irrigation facilities and financial assistance, timely supply of improved inputs, etc. cropping intensity can be increased and level of adoption of new technology can be raised. This would generate more employment and income to the farmers. Measures for creating opportunities of non-farm employment in rural areas can be taken up on the basis of availability of raw materials and markets.

Biswas, P. 1989. Economic Evaluation of Various Criteria for Determining Premium Rates in Comprehensive Crop Insurance Scheme—A Case Study of Uttar Pradesh. G.B. Pant University of Agriculture and Technology, Pantnagar, Nainital. *Major Adviser* : Bhagwati Prasad.

The study was carried out to examine the distribution for time series data on yields of major crops in different regions of the Uttar Pradesh State and measure the extent of rich and expected indemnity therein to evaluate different criteria for determining premium rates and to determine effects of yield risk and level of indem-