SUMMARY

The investigation designed "Studies on production potential of crops grown in sequence under rainfed upland of Chotanagpur plateau" has been undertaken in Kharif (rainy) and Rabi (winter) seasons of two consecutive years, 1987-88 and 1988-89. The experiment was conducted at Deochanda Experiment Station, Damodar Valley Corporation, Hazaribag, Bihar. The treatments consisted of crop sequences based on rice, maize and peanut in Kharif and barley, chickpea, lentil, linseed, safflower and toria respectively in Rabi. The experiment was laid out in a randomized block design with three replications.

The data on yields of crops grown in respective seasons, the overall performance of crops grown in sequence, economics of raising crops in respective seasons as well as in double cropping sequence have been recorded and analysed statistically.

The grain yield of rice has been considerably higher in 1987-88 (first year) than in 1988-89 (second year). On the other hand, maize and peanut have shown higher yield in second year as compared with first year. Such variation in crop yield has been probably due to differences in climate in two years. In Kharif, maize has outyielded rice and peanut. Among the Rabi crops grown on Kharif fallow lands, barley, chickpea and toria have shown higher production potential than that of lentil, linseed and toria. Lentil has given the lowest yield of all Rabi crops grown in sequence. Among the Rabi crops, chickpea, barley and safflower have proved to be most efficient and suitable for inclusion in crop sequence.

Among rice, maize and peanut based crop sequences, the maize based sequences, in general, have surpassed the physical output followed by rice based sequences. Peanut based sequences, however, have given lower physical output compared to maize and rice based sequences. Among the rice based patterns, rice-chickpea has offered by far the highest mean physical output in terms of total grain yield followed by rice-safflower and rice-barley. Similarly, in maize based cropping sequences, maize-chickpea pattern has been found to be more productive followed by maize-safflower. In peanut based sequences,
peanut-chickpea system has given higher mean total yield followed by peanut-barley and peanut-safflower. While considering the production potential of the cropping sequences, in general, it is clearly evident that maize-chickpea sequence has offered by far the highest average physical output in terms of total grain yield under rainfed upland conditions of plateau region. The maize-safflower pattern has followed next in order of physical output.

Among the Kharif crops of rice, maize and peanut, maize has manifested higher yield of by-product. Maize-safflower and maize-chickpea systems have shown greater efficiency in production of by-product. Rice-lentil and rice-toria systems have proved their inefficiency in production of by-product.

Crops in Kharif have given higher maize equivalents as compared to crops grown in Rabi season. The results further reveal that among the different cropping sequences, maize-chickpea, peanut-chickpea and rice-chickpea have resulted in higher maize equivalent yields.

Maize based sequences, in general, have shown higher production efficiency over rice and peanut based sequences. In rice based sequences, inclusion of either toria or chickpea has resulted in higher production efficiency of the sequence. Similarly, toria or chickpea when grown in peanut based sequences have given higher production efficiency in the sequences. However, among the cropping sequences tried, maize-toria has proved to be most efficient followed by maize-chickpea in terms of production efficiency.

Analysis of economics of production reveal that in rice based sequences, rice-chickpea and rice-linseed patterns have given higher gross return. Among maize based sequences, maize-chickpea and maize-toria have been most productive. Similarly, among peanut based sequences, peanut-chickpea and peanut-toria have been more profitable in terms of gross return. Inclusion of lentil in sequential cropping has resulted in comparatively lower gross return from rice, maize or peanut based sequences.

The results clearly reveal that maize-chickpea, rice-chickpea and peanut-chickpea systems have been most remunerative compared to other sequences. Similarly, these three systems have also been found to be
significantly superior to rest of the patterns in respect of net returns. The higher net returns in maize-chickpea, rice-chickpea and peanut-chickpea systems have been due to higher production potential of legume chickpea compared to other Rabi crops.

The results further reveal that the crops like rice, chickpea, linseed and toria have recorded higher cost-benefit ratio (more than 2) than that of maize, peanut, barley, lentil and safflower in respective seasons of their cultivation. Among the crop sequences, rice-chickpea has offered by far the highest cost-benefit ratio followed by maize-chickpea system.

The results of the present investigation clearly point out the ample scope for increased agricultural production as well as monetary returns through double cropping by adopting suitable crop sequences on rainfed upland condition. Thus, there is a greater possibility of increasing crop intensity to 200 per cent through double cropping by which the production would be increased to 31.7 per cent with corresponding increase in net return by 1.46 times higher from per rupee investment in rainfed upland of plateau region. Furthermore, the results of the present investigation convincingly indicate that for achieving higher production per unit area per year the ideal double crop sequence should consist of maize or rice in Kharif season and chickpea in the Rabi season under rainfed upland condition of chotanagpur plateau region.