Chapter - XII

SUMMARY AND CONCLUSION

Department of Agriculture U.P. has 186 farms with a geographical area of 8080.76 hectares and area under cultivable land is 5222.08 hectares. Out of 5222.08 hectares cultivable land, 4818.70 hectares is under cultivation of the 186 Govt. Agriculture farms in the State, 71 per cent (132) are running on profit and 29 per cent (54) are running in loss. 49 per cent (2366.14 hectares) of the cultivated area of these farms is giving loss, which is distributed to usur, ravinous, flood affected, pathari, and hill. 132 farms under the general category of farms are giving a net profit of Rs. 1925 per hectare per annum over the years 1985-86 to 1991-92. However, if profit and loss per hectare per annum are calculated of all the farms together, the average profit comes to Rs. 292.68 per annum which is quite low over the years 1986-87 to 1991-92.

Uttar Pradesh is covered under 4 Agro-climatic zones. Department of Agriculture, U.P. has established agriculture farms in different numbers in most of the districts. There was no any agriculture farm in district Garhwal in agroclimatic zone-1, district Mau in Agroclimatic zone-4 and district Saharanpur and Faizabad in agroclimatic zone-5. Thus, out of 64 districts of U.P., agriculture farms have been established in 60 districts. Number of districts and number of farms depend upon availability of land.

Is is necessary for revaluation/of farms and establishment on the basis of the soils, agroclimatic condition and the main crops of the district.

A three stage stratified random sampling technique has been used to select the divisions, districts and Govt. Agril. farms. A list of all the divisions of U.P. alongwith their agroclimatic zone was prepared. Out of 4
agroclimatic zones, 6 divisions viz. Jhansi, Meerut, Agra, Faizabad, Gorakhpur and Kumau were selected randomly from different agroclimatic zones of U.P. Selection of the districts from the selected divisions forms the second stage of sampling. A list of all the districts of the selected divisions was prepared. From this list at least 3 districts were selected from each selected division. Selection of the Govt. Agril. farms formed the third stage sampling design. A list of all the Govt. Agril. farms was prepared. A random sample of one Govt. Agril. Farm from each selected district was drawn. Thus, 10 Govt. Agril. farms were selected and categorised as general, usar, pathari, problematic and hilly. The selected Govt. agril. farms fall under different categories viz. Hill-3, General-7, Usar-3, Pathari-3 and problematic-2.

The total geographical area of division Kumau, Gorakhpur, Faizabad, Meerut, Agra and Jhansi was 2228066, 2483737, 3113871, 2232471 and 2959449 hectares, respectively of the total geographical area, net sown area of these divisions was 18.42, 64.94, 75.26, 72.92 and 63.76 per cent respectively. The intensity of cropping for the Kumau, Gorakhpur, Faizabad, Meerut, Agra and Jhansi, divisions as a whole was 169.35, 153.46, 157.44, 163.67, 151.27 and 111.17 per cent, respectively during 1988-89. The intensity of cropping of Deoria, Basti, Gorakhpur, Barabanki, Gonda, Sultanpur, Meerut, Bulandshahr, Gaziabad, Aligarh, Mathura, Mainpuri, Jhansi, Jalaun and Hamirpur as whole was 164.13, 168.93, 178.63, 150.69, 147.07, 151.91, 162.95, 161.18, 152.01, 163.84, 173.27, 166.24, 159.02, 143.45, 155.93, 106/93, 106.07 and 105.44 per cent respectively during 1988-89.

The total irrigated area of the identified districts viz. Almora, Nainital, Pithoragarh, Deoria, Basti, Gorakhpur, Barabanki, Gonda, Sultanpur, Meerut, Bulandshahr, Gaziabad, Aligarh, Mathura, Mainpuri, Jhansi, Jalaun and Hamirpur was 19877, 247788, 8414, 327240, 370265, 344280, 280112, 218396,
190856, 488007, 544240, 283835, 325381, 333370, 103569, 94057 and 104239 hectares, respectively.

The fertilizer consumption per hectare in identified districts viz. Almora, Nainital, Pithoragarh, Deoria, Basti, Gorakhpur, Barabanki, Gonda, Sultanpur, Meerut, Bulandsahar, Gazibad, Aligarh, Mathura, Mainpuri, Jhansi, Jalaun and Hamirpur came to 5.90, 199.84, 5.50, 128.22, 75.29, 89.83, 84.81, 48.09, 67.79, 109.19, 89.81, 136.11, 89.23, 73.72, 94.78, 36.44, 31.88 and 21.02 kilograms during 1988-89 respectively.

The main crops grown in the identified districts were wheat, barley, gram, pea and mustard in rabi and paddy, maize and jowar in kharif. Area under wheat was the highest in most of the identified districts followed by paddy, gram, maize, mustard, barley, pea and jowar.

The productivity of rice, wheat, and barley was 10.82, 9.65 and 10.19 quintals per hectare respectively in almora district. In Nainital district, the productivity of rice, wheat, maize and mustard came to 30.68, 29.07, 11.00 and 4.93 quintals per hectare respectively, in Pithoragarh district, the productivity of wheat and rice was 12.90 and 11.39 quintals per hectare, respectively. In Deoria district, the productivity of wheat, rice, gram, maize and mustard was reported as 23.04, 19.34, 11.12, 8.31 and 7.15 quintals per hectare respectively. In Basti, the productivity of the wheat, barley, rice, pea, gram, mustard and maize was 19.61, 17.07, 13.70, 9.80, 9.19, 6.57 and 5.76 quintals per hectare, respectively. In Gorakhpur district, the productivity of wheat, rice, barley and gram was reported as 23.41, 17.26, 17.26, 17.07 and 9.40 quintals per hectare, respectively. In Barabanki district, the productivity of wheat, rice, jowar and gram came to 22.80, 21.59, 10.54, and 9.36 quintals per hectare respectively. In Gonda district, the productivity of wheat, rice, gram, maize and mustard was 18.80, 11.72, 11.19, 8.72 and 6.01 quintals per
hectare respectively. In Sultanpur district, the productivity of wheat, rice, barley, jowar, maize, and gram was reported as 20.77, 16.78, 15.38, 10.91 and 9.94 quintals per hectare respectively. In Meerut district, the productivity of wheat, rice, maize and mustard was 31.78, 21.54, 15.30 and 8.66 quintals per hectare, respectively. In Bulandsahar district, the productivity of wheat, barley, pea, rice, gram, maize and mustard was 32.18, 29.58, 15.26, 13.92, 13.65, 13.16 and 8.66 quintals per hectare respectively. In Gazipur district, the productivity of wheat, rice, and maize was reported as 28.75, 17.44 and 12.65 quintals per hectare, respectively. In Aligarh district, the productivity of wheat, barley, rice, pea, gram, maize and mustard came to 28.73, 26.18, 18.76, 16.01, 13.82, 12.08 and 8.77 quintals per hectare, respectively. In Mathura district, the productivity of wheat, barley, rice, and mustard was 27.84, 25.24, 15.36 and 11.16 quintals per hectare respectively. In Mainpuri district, the productivity of wheat, barley, pea, rice, gram, maize and mustard was reported as 23.45, 23.37, 16.56, 14.36, 14.32 and 6.85 quintals per hectare respectively. In Jalaun district, the productivity of wheat, pea, barley, jowar, gram and mustard was 19.86, 13.25, 12.30, 8.79, 8.48 and 5.74 quintals per hectare, respectively. In Jhansi district, the productivity of wheat, jowar and gram was 17.25, 8.16 and 7.93 quintals per hectare respectively. In Hamirpur district, the productivity of wheat, pea jowar, gram and mustard was reported as 13.25, 13.25, 9.30, 4.20 and 3.68 quintals per hectare, respectively.

On an average, the total area of the hill farms came to 20.36 hectares out of which cultivated area was 15.67 hectares. In general category, on an average, the total area of the farms came to 21.57 hectares of which cultivated area was 17.38 hectares. In usar category, on an average, the total area was 13.91 hectares. In problematic category, on an average, the total area of the farms came to 20.79 hectares in which cultivated area was 18.34 hectares. In Pathari category, on an average, the total area of the farms came to 31.47
hectares in which cultivated area was 13.41 hectares. On an average, 82.78 per cent of the total cultivated area was under irrigation. It varied from 76.36 per cent on the general farms to 100 per cent on the problematic farms. The percentage area under irrigation was the highest on the problematic farms and the lowest on the general farms. The reason for higher percentage of irrigated area on problematic farms was mainly because of the fact that the farm superintendents of problematic farms were very sincere to irrigation on their farms. The main source of irrigation on the sample farms was tubewell.

The number of permanent labours varied on different sample farms. The number of permanent labours on the farms was not decided on the basis of total geographical area.

The resources available on the farms varied from farm to farm. Annual budget of the farms also varied from 0.50 to 4.00 lakh rupees on the sample farms.

The total profit of the sample farms from last three years (1988-89 to 1990-91) was calculated at Rs. 73833.00.

In the hill farms, wheat accounted for the highest percentage being 47.69 to the total cropped area followed by paddy 42.87 per cent and other crops (barley, madua, mosur etc) 9.44 per cent. The main crops like wheat, paddy, mustard/toria and gram/pea were grown on the general farms. In this category, wheat accounted for the highest percentage being 33.17 to the total cropped area followed by paddy 21.53 per cent, mustard/toria 8.74 per cent and gram/pea 3.62 per cent, respectively wheat and paddy were the main crops grown on the usar farms. In this category wheat accounted for the highest percentage being 39.87 to the total cropped area followed by paddy 36.14 per cent. In problematic farms, paddy accounted for the highest percentage being 46.88 to the total cropped area followed by wheat 23.74 per cent and
mustard/toria 8.88 per cent. In pathari farms, gram/pea accounted for the highest percentage being 37.99 to the total cropped area followed by wheat 24.91 per cent, paddy 10.60 per cent and mustard/toria 0.88 per cent. On an average, percentage area under wheat was the highest being 34.48 to the total cropped area followed by paddy 29.27 per cent because of the fact that these are two main crops of food consumption.

The cropping intensity on hill farms varied from 183.78 to 190.70 per cent and on an average it came to 188.90 per cent. On general farms, it varied from 166.74 to 219.44 per cent with an average of 200.48 per cent. On usar farms, it varied from 153.21 to 200.00 per cent with an average of 182.06 per cent. On problematic farms, it varied from 175.58 to 198.79 per cent and on an average it came to 187.19 per cent. On pathari farms it varied from 100.00 to 198.13 per cent with an average of 142.84 per cent. Intensity of cropping on the hill, general and problematic farms was higher than the districts. Intensity of cropping on usar and pathari farms was higher than the district in two farms out of three. Intensity of cropping was higher on the farms of agroclimatic zone-5 than the farms falling under other agroclimatic zones.

Intensity of cropping of 88.88 per cent farms was higher than the districts. The coefficient of correlation between farm profit and cropping intensity was worked out to 0.527 which was positive and non-significant at 5 per cent level, meaning thereby that the intensity of cropping and farm profit were not correlated.

The irrigation percentage varied from 54.05 to 100.00 per cent on hill farms, 79.42 to 100.00 per cent on general farms, 62.50 to 100.00 per cent on usar farms, 100.00 per cent on problematic farms and 65.70 to 100.00 per cent on pathari farms. Irrigation percentage of 2, hill farms (out of 3)
was higher than the districts. In general farms, irrigation percentage of 4, farms was higher than the districts. In usar farms, irrigation percentage of 2, farms (out of 4) was higher than the districts. In problematic and pathari farms, the irrigation percentage was higher than the districts.

The irrigation percentage of 72.22 per cent farms was higher than the districts. The coefficient of correlation between farm profit and irrigation percentage was worked out to 0.445 which was positive and non-significant at 5 per cent level, meaning thereby that the irrigation percentage and farm profit were not correlated.

The fertilizer consumption varied from 133.35 to 204.35 kologrns per hectare on hill farms, 59.90 to 218.63 kg. per hectare on general farms, 150.74 to 172.03 kg. per hectare on usar farms, 211.45 to 271.81 kg. per hectare on problematic farms and 38.91 to 86.75 kg. per hectare on pathari farms.

Fertilizer consumption on hill, usar, problematic and pathari farms was higher than the districts. In general farms, fertilizer consumption on 6 farms (out of 7) was higher than the districts. The fertilizer on 6, (out of 7) was higher than the districts. The fertilizer consumption in agroclimatic zone-4 was higher than the other agroclimatic zones. The fertilizer consumption of 94.44 per cent farms was higher than the districts consumption.

The fertilizer productivity of the farms varied from 3.39 to 13.24 kg in wheat, 0.93 to 12.44 kg in paddy, 3.19 to 23.05 kg in gram, 32.63 to 39.46 kg in pea and mustard 1.89 to 2.82 kg. The fertilizer productivity of different crops was lower than its standard. In case of pea crop, the fertilizer productivity was higher than its standard.

Per hectare labour use in wheat varied from 76 to 139 labourers. It varied from 97 to 120 labourers in hill farms, 87 to 126 labours in general
farms, 112 to 139 labours in usar farms, 80 labours in problematic farms and 76 to 106 labours in pathari farms. In paddy crops, per hectare labour use varied from 120 to 256 labours. In hill, general, usar, problematic and pathari farms it varied from 148 to 156, 120 to 193, 127 to 153, 255 to 256 and 169 labours, respectively. In gram/pea crops it varied from 50 to 94 labours, in general and pathari farms it varied from 87 to 94 and 45 to 83 labours respectively. In mustard crops it varied from 53 to 103 labours. In general farms it varied from 62 to 103 labours. Dept. of Agriculture, U.P. recommended 75, 136, 42 and 49 labours per ha for wheat, paddy, gram/pea and mustard crops, respectively.

The labour use in 100, 84.62, 100 and 100 per cent farms was higher than the recommended labour norms in wheat, paddy, gram/pea and mustard respectively. Excess percentage of the labour was 32.50, 25.06, 70.95 and 47.96 per cent in wheat, paddy, gram/pea and mustard, respectively.

The per hectare labour use in wheat production on an average, came to 10 days in land preparation 4 days in manure and fertilizer, 7 days in seed and sowing, 4 days in plant protection, 16 days in irrigation, 11 days in weeding and hoeing, 13 days in chaukidari, 31 days in harvesting and 21 labour days in threshing. Labour use in land preparation 100.00, in seed and sowing 133.33, in irrigation 60.00, in weeding and hoeing 120.00, in harvesting 24.00, and in the threshing 40.00 per cent labour was more than the recommended labour norms. In manure and fertilizer and plant protection labour use was less than its recommended labour norms. Dept. of Agriculture U.P. has not fixed labour norms against chaukidari but most of the farms supdts on an average uses 13 labour per ha against chaukidari.

Labour use in paddy production, on an average, in land preparation came to 9 days, in manure and fertilizers 5 days, in transplanting 54 labour
days, in irrigation 11 labour days, in plant protection 4 labour days, in weeding and hoeing 27 labour days, in chaukidari, 9 labour days, in harvesting, 28 labour days and in threshing, 27 labour days per ha. As regards labour use norms in land preparation 80.00, in irrigation 83.33, in plant protection 100.00, in weeding and hoeing 145.45, in harvesting 40.00 and in threshing 22.73 per cent labour was more than its recommended labour norms.

The labour use in gram/pea production, on an average, in land preparation came to labour days 4, in manure and fertilizers 2 labour days, in seed and sowing 4 labour days, in irrigation 6 labour days, in plant protection 2 labour days, in weeding and hoeing 12 labour days, in harvesting 18 labour days, in threshing 12 labour days and in chaukidari 25 labour days per ha. As regards labour use norms, in irrigation 200.00, seed and sowing 33.33, weeding and hoeing 500.00, harvesting 20.00 and the threshing 20.00 per cent more labour were used as against recommended labour norms.

On an average the labour efficiency in paddy crop in hill farms came to 89.54, in general 84.17, usar 97.29, problematic 53.44 and pathari 80.47 per cent. Labour efficiency in wheat crop, on an average, in hill came to 69.97, general 72.10, usar 60.46, problematic 93.75 and pathari 84.72 per cent. In gram/pea crops, labour efficiency, on an average, in general and pathari farms came to 58.41 and 90.20 per cent respectively. In mustard crop, on an average, in general and problematic farms it came to 64.86 and 92.45 per cent respectively.

On an average, labour productivity of paddy grain and seed came to 23.17 and 21.62, 12.77 and 10.02, 19.06 and 14.59, 12.21 and 10.47, and 20.71 and 17.31 kg in hill, general, usar, problematic and pathari farms respectively. In wheat grain and seed, on an average, it came to 25.37 and 23.02, 28.17 and 23.91, 19.80 and 16.99, 26.52 and 22.06 and 28.86 and 24.36 kg in hill,
general, usar, problematic and pathari farms, respectively. In gram, grain and seed, on an average, it came to 4.44 and 3.32 and 12.04 and 8.34 kg in general and pathari farms, respectively. In pea grain and seed it came to 21.17 and 16.90 and 15.92 and 10.76 kg in general and pathari farms, respectively. In mustard grain and seed, it came to 7.88 and 6.74 and 4.45 and 3.98 kg in general and problematic farms, respectively. From above analysis the labour productivity in wheat crop was higher than the other crops.

The productivity of wheat varied from 4.89 to 23.01 quintals per ha in hill farms, 17.72 to 38.62 in general farms, 11.30 to 35.05 in usar farms, 14.10 to 21.22 in problematic farms and 20.63 to 29.04 in pathari farms. Productivity of wheat in general farms was higher than the districts. In usar farms, productivity of one farms (out of 3) was higher than the district. In problematic farms, productivity of one farm (out of 2) was higher than the district. In Pathari farms the productivity of wheat was higher than the district. In hill farms productivity of wheat was higher than the district. The productivity of wheat in agro-climatic zone-5 was higher than other agro-climatic zones.

Fisher 't' test between farm productivity and district productivity of wheat was worked out to 0.141 which was non-significant at 5 per cent level, meaning thereby that the district productivity was not effected by farm productivity.

The productivity of rice which varied from 15.73 to 6.35 quintals per hectare in hill farms, 1.87 to 25.61 quintals per ha in general farms, 14.42 to 23.33 quintals per ha in usar farms, 15.62 to 25.33 quintals per ha in problematic farms and 23.33 quintals, per ha in pathari farm. Productivity of rice in problematic and pathari farms was higher than the district's productivity.

In general farms, the productivity of rice in 2 farms (out of 6) was higher than district and in usar farms, it was higher than the district in
one farm (out of 3). The productivity of rice on agroclimatic zone-4 was higher than other agroclimatic zones.

Fisher 't' test between farm productivity and district productivity of rice was worked out to 0.748 which was non-significant at 5 per cent level, meaning thereby that the district productivity was not affected by farm productivity.

The productivity of gram in pathari farms was higher than the district productivity. In general farms, it was higher than the district on one farm (out of 2). The productivity of gram varied from 4.17 to 15.50 quintals per hectare and 6.14 to 8.66 quintals per hectare in general and pathari farms, respectively. The productivity of gram in agroclimatic zone-5 was higher than other agro-climatic zones.

The productivity of pea varied from 12.38 to 13.07 and 1.27 to 14.60 quintals per hectare in general and pathari farms respectively. Productivity of pea in general farm was lower than the district's productivity and in pathari farms it was higher than the districts in 2 farms (out of 3). The productivity of pea in agroclimatic zone-8 was higher than agroclimatic zone-5.

The productivity of mustard varied from 4.23 to 7.23 and 2.36 to 3.02 quintals per hectare in general and problematic farms, respectively. The productivity of mustard in general and problematic farms was higher than the district's productivity.

The productivity of 41.17 per cent farms was lower than the district in wheat crop. In paddy, productivity of 57.14 per cent farms was lower than the district. In gram, pea and mustard, the productivity of 75.00, 60.00 and 100.00 per cent farms was lower than the district, respectively.

On an average, the cost of cultivation per hectare of wheat came
to Rs. 7380.40 which varied from Rs. 5928.67 to Rs. 8944.24 on the sample farms. The per hectare cost of wheat came to Rs. 7104.17 on hill, Rs. 8459.69 on general, Rs. 8944.24 on usar, Rs. 6581.74 on problematic and Rs. 5928.67 on pathari farms. On an average, the total human labour accounted for the highest share being 31.78 per cent to the total cost followed by manures and fertilizers, 22.96 per cent. The total cost of wheat was the highest on the usar farm because of higher expenditure incurred on cash inputs like labour and irrigation by the farm supdt. of this type of farms.

On an average, the cost of cultivation per hectare of paddy came to Rs. 9203.90 which varied from Rs. 6969.19 to Rs. 11934.97 on the sample farms per hectare cost of paddy came to Rs. 7595.24 on hill, Rs. 10071.44 on general Rs. 6969.19 on usar, Rs. 11934.97 on problematic and Rs. 9448.59 on pathari farms. On an average, the total human labour accounted for the highest share being 43.86 per cent to the total cost followed by manures and fertilizers 21.12 per cent. The total cost of paddy was the highest on problematic farms because of higher expenditure incurred on cash inputs like human labour and manures and fertilizers by the Farm Supdt. of this type of farm.

The average cost of cultivation per hectare of gram/pea came to Rs. 5717.09 which varied from Rs. 5288.83 to Rs. 5665.31 on general and Rs. 5288.83 on pathari farms. On an average, the total human labour accounted for the highest share being 31.45 per cent to the total followed by seed, 31.24 per cent. The total cost of gram/pea was the highest on general farms because of higher expenditure incurred on cash inputs like human labour, irrigation and plant protection.

On an average, the cost of cultivation per hectare of mustard came to Rs. 5392.48 which varied from Rs. 4364.71 to Rs. 6420.21 on the sample farms. It came to Rs. 6420.21 on general and Rs. 4364.71 on problematic farms.
On an average, the human labour accounted for the highest share being 28.15 per cent to the total cost followed by bullock/tractor power 24.31 per cent and manure and fertilizers 19.57 per cent. The total cost of mustard was the highest on general farms because of higher expenditure incurred on cash inputs like human labour, bullock/tractor and manures and fertilizers.

On an average, the yield per hectare of wheat grain and seed form came to 21.86 and 18.41 quintals respectively and by product (Bhusa) came to 24.27 quintals. The per hectare yield of wheat/grain was 13.95 quintals in hill, 28.79 quintals in general, 24.04 quintals in usar, 17.66 quintals, in problematic and 24.84 quintals in pathari farms. The per hectare yield of wheat in seed form was 9.65 quintals in hill, 25.81 quintals in general, 20.61 quintals in usar, 15.18 quintals in problematic and 20.80 quintals in pathari farms. The average gross income per hectare was worked out to Rs. 8973.80 and Rs. 14431.43 in grain and seed form respectively. The net return, on an average, came to Rs. 1593.40 and Rs. 5280.37 in grain and seed form, respectively. The cost of production per quintals of wheat grain and seed form, on an average, was worked out to Rs. 291.97 and Rs. 426.75 respectively. On an average, the breakeven point came to 20.79 and 13.60 quintals per hectare in grain and seed form of wheat respectively.

Wheat grain, on an average, gave a net return of Rs. 1593.40 per hectare. The per hectare average values of (wheat grain) input and output were calculated at Rs. 7380.40 and Rs. 8973.80 respectively. Break even point of wheat grain came to 20.79 quintals per hectare. On an average, the input-output ratio of wheat grain was calculated at 1:1.22 which was the highest on pathari farms because of relatively higher yield and output of these farms. If wheat sold in seed form, on an average, it gave a net return of Rs. 5280.37 per hectare. The per hectare average value of (wheat seed) input and output were calculated at Rs. 9157.06 and Rs. 14431.43 respectively. The break even
point of wheat seed came to 13.60 quintals per hectare. On an average, the input-output ratio of wheat in seed form was calculated at 1:1.58 which was the highest on pathari farms, because of relatively higher yield and output on these farms.

On an average, the yield per hectare of paddy grain and seed came to 20.43 and 17.63 quintals respectively and by product came to 21.67 quintals. The per hectare yield of paddy grain and seed was 11.04 and 8.20 quintals in hill, 20.63 and 16.51 quintals in general, 18.49 and 17.35 quintals in usar, 28.67 and 26.60 quintals in problematic and 23.33 and 19.50 quintals respectively in pathari farms. The average gross income per hectare was worked out to Rs. 5630.65 and Rs 11606.19 in grain and seed form respectively. The cost of production per quintal of paddy grain and seed, on an average, was worked out to Rs. 433.17 and Rs. 569.57, respectively. On an average, the break even point came to 34.73 and 17.07 quintals in grain and seed form of paddy, respectively.

Paddy grain, on an average, gave a net return of Rs.-3573.25 per hectare. The per hectare average values of (paddy, grain) input and output were calculated at Rs. 9203.90 and Rs. 5630.65 respectively. Break even point of paddy grain came to 34.73 quintals per hectare. On an average, the input-output ratio of paddy grain was calculated at 1:0.61. If paddy sold in seed form, on an average, it gave a net return of Rs. 995.32 per hectare. The per hectare average values (paddy seed) of input and output were calculated at Rs. 10610.87 and Rs. 11606.19 respectively. The break even point of paddy seed came to 17.07 quintals per hectare. On an average, the input-output ratio of paddy in seed form was calculated at 1:1.09.

On an average, the yield per hectare of gram, grain and seed form came to 8.62 and 6.79 quintals, respectively and byproduct came to 4.73 quintals. The per hectare yield of gram grain was 9.84 quintals in general and 7.40
quintals in pathari farms. The per hectare yield of gram in seed form was 7.90 quintals in general and 5.67 quintals in pathari farms. The average gross income per hectare was worked out to Rs. 6391.40 and Rs. 12977.71 in grain and seed form, respectively. The cost of production per quintal of gram grain and seed form, on an average, was worked out to Rs. 621.29 and Rs. 838.85, respectively.

Gram in grain form, on an average, gave a net return of Rs. 914.31 per hectare. The per hectare average values of (gram grain) input and output were calculated at Rs. 5477.09 and Rs. 6391.40 respectively. Break even point of gram grain came to 7.56 quintals per hectare. On an average, the input-output ratio of gram grain was calculated at 1:1.17 which was the highest on general farms because of relatively higher yield and output on these farms. If gram sold in seed form, on an average, it gave a net return of Rs. 6630.00 per hectare. The per hectare, average values of (gram seed) input and output were calculated at Rs. 6347.71 and Rs. 12977.71 respectively. The break even of gram (seed) came to 3.70 quintals per hectare. On an average, the input-output ratio of gram in seed form was calculated at 1:2.05 which was the highest on general farms because of relatively higher yield and output on these farms.

On an average, the yield per hectare of pea grain and seed came to 11.06 and 8.12 quintals respectively and the yield of by product came to 10.71 quintals. The per hectare yield of grain and seed was 12.73 and 9.57 quintals in general and 9.38 and 6.67 quintals in pathari farms respectively. The average gross income per hectare was worked out to Rs. 8063.30 and Rs. 15110.34 in grain and seed form respectively. The cost of production per quintal of pea grain and seed, on an average, was worked out to Rs. 475.48 and Rs. 706.97 respectively.
Pea grain and seed, on an average, gave a net return of Rs. 2586.21 and Rs. 8516.19 per hectare respectively. The per hectare average values of pea grain and seed of input and output were calculated at Rs. 5477.09 and Rs. 6594.15 and Rs. 8063.30 and Rs. 15110.34 respectively. Break even points of pea grain and seed came to 7.82 and 4.07 quintals per hectare respectively. On an average, the input-output ratio of pea grain and seed was calculated at 1:1.47 and 1:2.29 which was the highest on general farms because of relatively higher yield and output on these farms.

On an average, the yield per hectare of mustard grain and seed came to 4.02 and 3.80 quintals respectively and yield of byproduct came to 1.96 quintals. The per hectare yield of grain and seed was 5.34 and 5.13 quintals in general and 2.69 and 2.46 quintals in problematic farms respectively. The average gross income per hectare was worked out to Rs. 3356.20 and Rs. 6988.30 in grain and seed form respectively. The cost of production per quintal of mustard grain and seed, on an average, was worked out to Rs. 1333.58 and Rs. 1591.65, respectively.

Mustard grain and seed, on an average, gave a net return of Rs. 2036.28 and Rs. 808.90 per hectare, respectively. The per hectare average value of mustard grain and seed of input and output were calculated at Rs. 5392.48 and Rs. 6179.40 and Rs. 3356.20 and Rs. 6988.30 respectively. Break even points of mustard grain and seed came to 6.50 and 3.41 quintals per hectare respectively. On an average, the input-output ratio of pea grain and seed was calculated at 1:0.62 and 1:1.19.

The productivity of paddy grain was lower than the break even point in all type of farms. Therefore, in economic point of view, the production of paddy was not good alternate on the farms in grain form. The productivity of wheat grain was more than the break even point on general and pathari
farms. In general farms, the break even point was 28.79 quintals per hectare. In pathari farms, the break even point was 16.70 quintals per hectare. The productivity of wheat was lower than the break even point in hill, usar and problematic farms. In economic point of view, the production of wheat was good alternate on the general and pathari farms while hill, usar, and problematic farms were not good alternate in grain form of wheat. The productivity of gram and pea was more than the break even points in general and pathari farms. The break even point of gram was 7.81 and 7.30 quintals per hectare and the productivity of this crop was 9.84 and 7.40 quintals per hectare on general and pathari farms respectively. The break even points of pea (pulse) was 12.73 and 9.38 quintals per hectare on general and pathari farms respectively. In economic point of view, the production of gram and pea on general and pathari farms were good alternate. The productivity of mustard (oilseed) was less than the break even point on general and problematic farms. The break even point of mustard was 7.54 and 5.26 quintals per hectare on general and pathari farms respectively. In economic point of view, the production of mustard in oilseed form was not good alternate on general and problematic farms.

The break even point was more than the actual productivity of paddy seed in hill general farms while productivity was more than the break even points on usar, problematic and pathari farms. The break point of paddy seed was 13.63, 18.85, 13.59, 22.89 and 18.20 quintals per hectare and productivity was 8.20, 16.51, 17.35, 26.60 and 19.50 quintals per hectare on hill, general, usar, problematic and pathari farms respectively. In economic point of view, the production of paddy seed was not good alternate on hill and general farms. The break even point was less than the actual productivity of wheat seed on general, usar, problematic and pathari farms, while, actual
productivity of wheat seed was less than the break even point on hill farms. The break even point of wheat seed was 12.24, 16.04, 16.18, 11.91 and 11.80 quintals per hectare and productivity was 9.65, 25.81, 20.61, 15.18 and 20.80 quintals per hectare on hill, general, usar, problematic and pathari farms respectively. In economic point of view, the production of wheat seed was good alternate on general, usar, problematic and pathari farms but not on hill farms. The break even point was less than the actual productivity of gram and pea seed on general and pathari farms. The break even point of gram seed was 3.88 and 3.52 quintals per hectare and the actual productivity was 7.90 and 5.67 quintals per hectare on general and pathari farms, respectively. The break even point of pea seed was 4.29 and 3.85 quintals per hectare and productivity was 9.57 and 6.67 quintals per hectare on general and pathari farms respectively. In economic point of view, the production of gram and pea seed was good alternate on general and pathari farms. The productivity of mustard seed was less than the break even point on the general and problematic farms were not good alternate of seed production. If paddy sold in grain form then 100 per cent forms were in loss and if it sold in seed form then 40 per cent forms were in loss. In case of wheat, general usar, problematic and pathari farms were in profit if wheat sold in both grain and seed form. Hill farms was in loss if wheat sold in grain form but in seed form, this farms was in profit. 20 per cent forms were in loss if wheat sold in grain form and in seed form, 100 per cent farms were in profit. In case of gram and pea, 100 per cent farms were in profit if gram and pea sold in both grain and seed forms. In case of mustard, 100 per cent farms were in loss if mustard sold in grain form but if mustard sold in seed form, 50 per cent farms were in loss.

The coefficient of correlation between productivity and net income, productivity and cost of cultivation and cost of cultivation and net income
were worked out to 0.294, 0.376 and 0.423 respectively. Which were negative and nonsignificant at 5 per cent level, meaning thereby that the net income was not effected by productivity and cost of cultivation and productivity was also not effected by cost of cultivation of paddy.

The coefficient of correlation between productivity and net income, productivity and cost of cultivation and cost of cultivation and net income were worked out to 0.799, 0.279 and 0.239 respectively. The coefficient of correlation between productivity and net income was positive and significant at 5 per cent level, meaning thereby that the net income of wheat was effected by productivity of wheat. The coefficient of correlation between productivity and cost of cultivation and cost of cultivation and net income was negative and nonsignificant at 5 per cent level, meaning thereby that the productivity and net income of wheat was not effected by cost of cultivation of wheat.

The processing cost per quintal of wheat, paddy, gram/pea and mustard was worked out to Rs. 97.14, 42.62, 42.08 and 48.03 respectively. In above processing cost, overhead cost and managerial cost were not included.

The chanas percentage in wheat crop, on an average came to 14.58 per cent, whereas the standard of 6 to 8 per cent laid down by the Dept. of Agriculture is very low as compared to the percentage of chanas received at farms. Chanas percentage of wheat crop varied from 10.35 to 30.82 per cent on different types of farms. The chanas percentage in paddy crop, on an average came to 14.60 per cent, whereas the standard of 10 to 12 per cent was laid down by the Dept. of Agri. chanas percentage of paddy crop varied from 6.17 to 25.72 per cent on different types of farms. The chanas percentage in gram, on an average came to 22.04 per cent, whereas the standard of 5 to 7 per cent is laid down by the Dept. of Agri. Chanas percentage of gram varied from 19.72 to 23.38 per cent on different types of farms.
The chanas percentage in pea came on an average 27.71 percentage, whereas the standard of 5 to 7 per cent is laid down by the Department of Agriculture. Chanas percentage of pea varied from 24.83 to 28.89 per cent on different types of farms. The chanas percentage in mustard, on an average, came to 4.51 per cent, whereas the standard of 8-10 per cent is laid down by the Department of Agriculture. Chanas percentage of pea varied from 3.97 to 8.57 per cent in different types of farms.

The loss due to excessive chanas at different farms varied from 8919.80 to 63248.78 in wheat. Total departmental loss due to excessive chanas of wheat came to Rs.143531.31. The loss due to excessive chanas at different farms varied from Rs.47924.28 to 22389.52 in paddy crop. Total departmental loss due to excessive chanas of paddy came to Rs.73941.82. The loss due to excessive chanas at different farms varied from Rs.6201.09 to 13633.83 in gram. Total departmental loss due to excessive chanas of gram came to Rs.19834.92. The loss due to excessive chanas at different farms varied from Rs.15098.16 to 44773.12 in pea. Total departmental loss due to excessive chanas of pea came to Rs.59871.28. In case of mustard crop, there was no excess loss due to chanas. In mustard, chanas percentage was lower than the recommended chanas percentage. The total loss due to excessive chanas at different farms from wheat, paddy, gram and pea came to Rs.297179.33.

The main technical problems of the sample farms were fertilizer management, less knowledge of plant protection and weedicides, late sowing of crops and late irrigation, respectively. The excess of chanas and labour, poor labour efficiency and availability of labour respectively were the main economic problems of the same farms, unavailability of impress and advance money, excess, of inspection officers wild animals, local pressure of leader and untimely inspection respectively were main problems. It is clear that production policy should be made for individual farms of different problems so that the productivity could be increased and more profits from the farms could be earned.
Production function analysis was carried out to measure the efficiency of input variables used in the process of production for wheat and paddy crops. Cobb-Douglas type of production function was finally retained for the purpose of analysis as it gave the best fit to the data and provided the highest $R^2$ value.

The production function shows that the contribution of the dependent factors i.e. man power, bullock/tractor power, manure and fertilizer, seed, irrigation and plant protection accounted 38.96 per cent variability in logarithms of gross income in case of wheat but in case of paddy it was found to be 64.20 per cent which was greater than the wheat crop.

The elasticity of production for various inputs varied from 0.0096 to 0.4091 in case of wheat and -4.0717 to 2.5735 in case of paddy. It reveals that the elasticity in case of wheat from man power was the highest, while it was the lowest for irrigation. On the other hand the highest elasticity for man power was 2.5737 and the lowest for seed -4.0717 in case of paddy.

The marginal value productivities of plant protection, bullock/tractor power and seed were relatively higher. On an average Rs.1.00 investment in plant protection, bullock/tractor power and seed gave an additional return Rs.8.3471, Rs.6.5597 and Rs.5.6823 respectively. The marginal value productivity of irrigation was the lowest in comparison to other resources. In case of paddy the marginal value productivity of irrigation, man power and manure and fertilizer were higher which gave additional return of Rs.6.23, Rs. 5.96 and Rs. 2.89 on an investment of Rs. 1.00 respectively.

The analysis of marginal value productivity clearly revealed that in case of wheat the higher investment may be made towards plant protection, bullock/tractor power and seed while in case of paddy the higher investment may be made in favour of irrigation and man power while drastic cut is needed.
in bullock/tractor power, seed and plant protection.

Due to lesser number of observation and higher use of some of the variable inputs, the elasticities of production were non significant and in some cases in negative. The negative values of elasticity of production and M.V.P. clearly indicated that excess use of bullock/tractor power, manure and fertilizer, seed and plant protection in the production of paddy. The use of these inputs needs to be rationalized.